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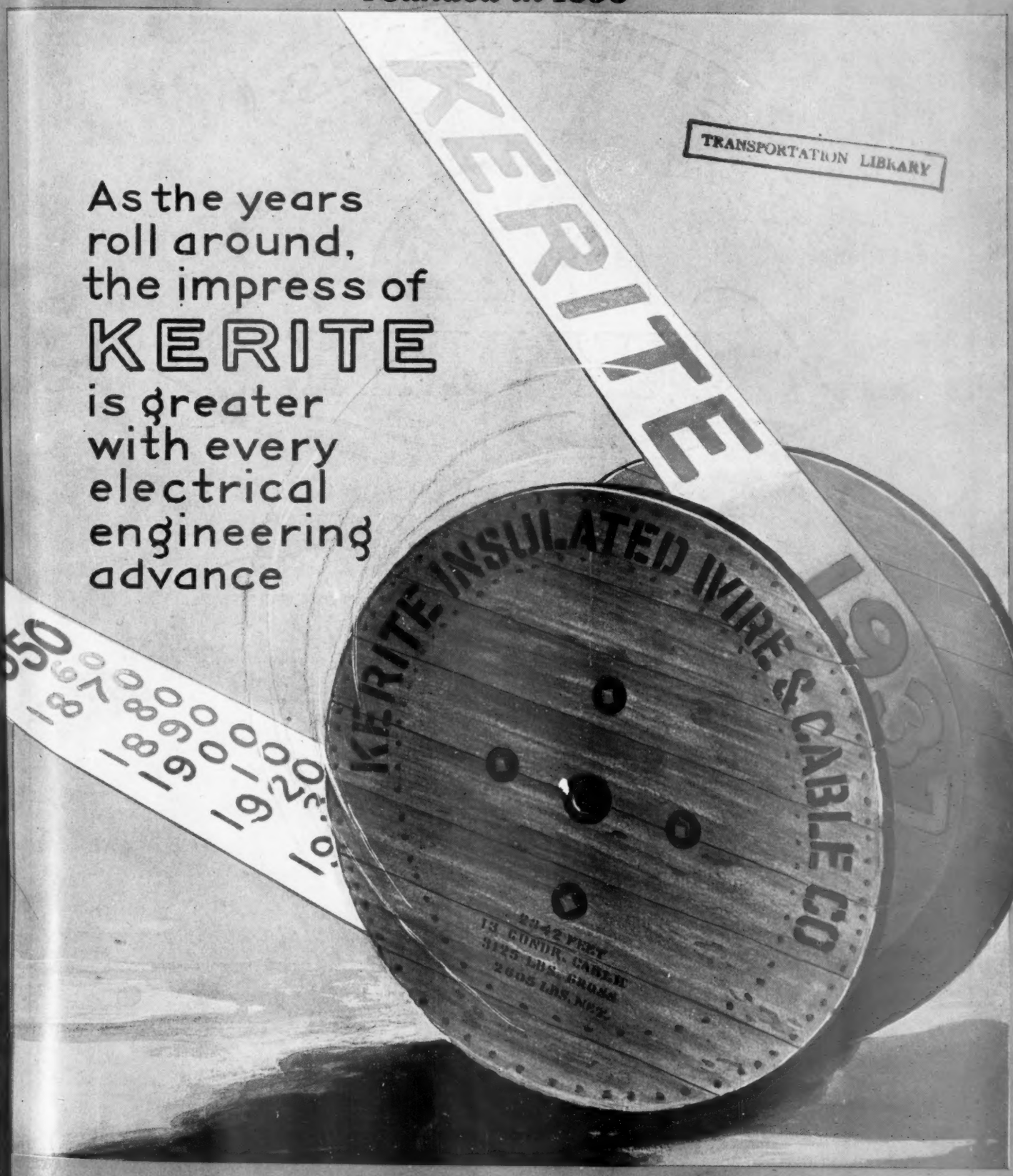

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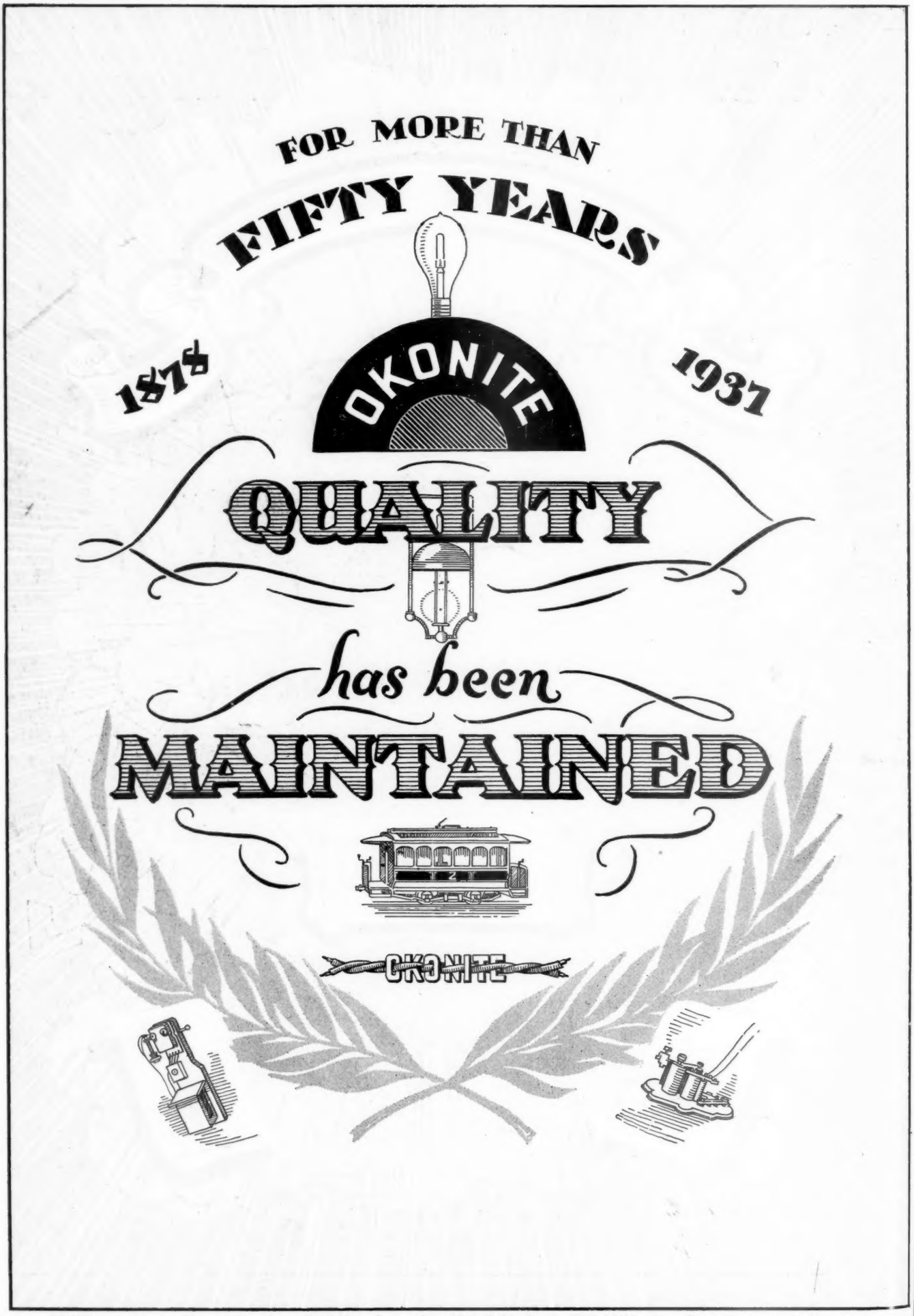

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Vol. 102 January 2, 1937 No. 1

Annual Statistical Number

EDITORIAL ..... **Page 1**

The Railways—Retrospect and Prospect 1

GENERAL REVIEW SECTION **4**

A Review of Railway Operations in 1936, by Dr. Julius H. Parmelee 4
The Outlook for 1937, by E. T. Howson 12
1936—A Year of Outstanding Traffic Developments, by R. A. Doster 16
The Second Year of the A. A. R., by H. F. Lane 21
Reserves of Equipment Approach Vanishing Point, by C. B. Peck 25
Expenditures on Fixed Property Are Increasing, by W. S. Lacher 28
Recovery Under Way in Canada 32
Mexican Railways Experience Further Gain in Traffic 36

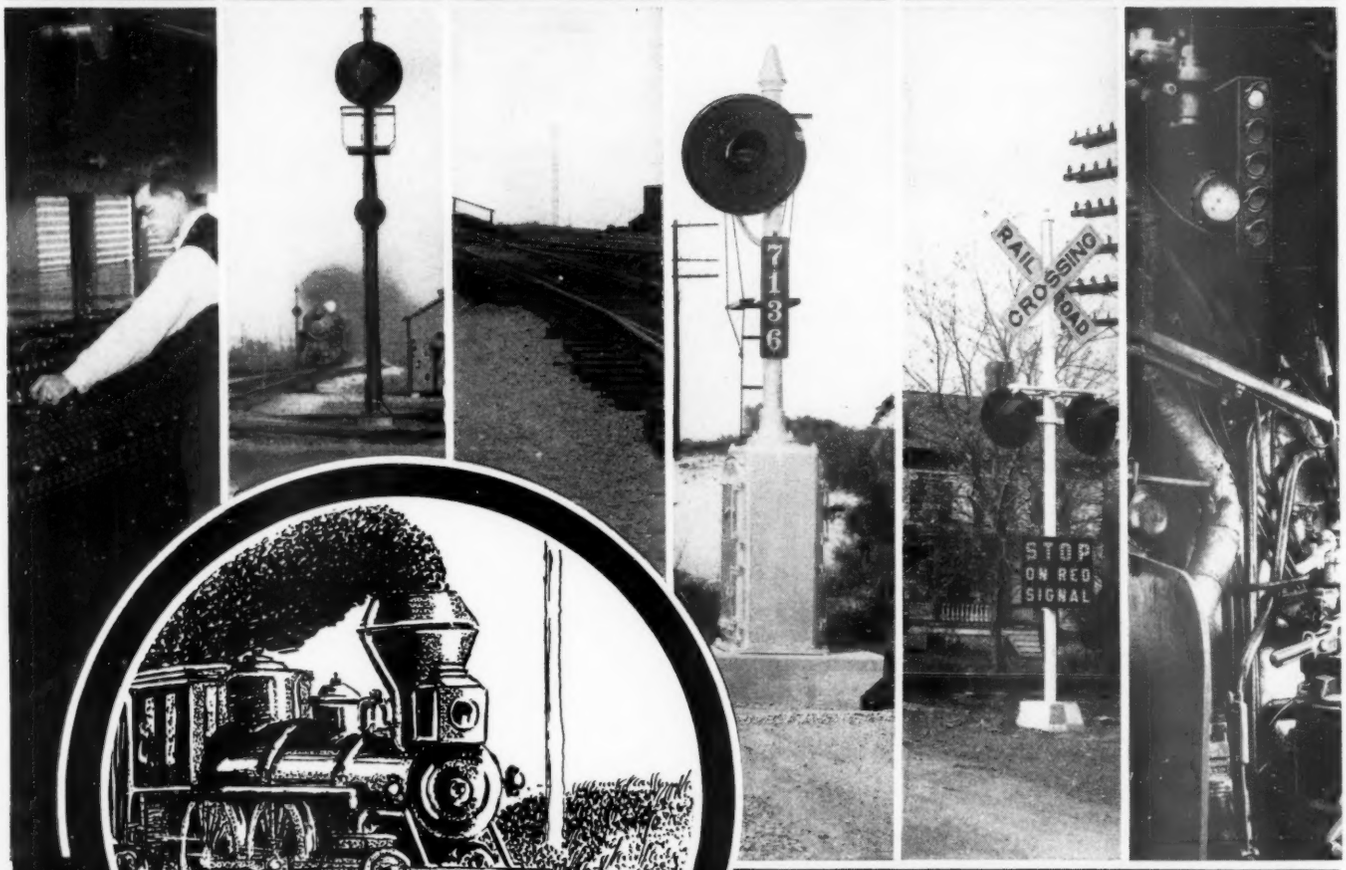
STATISTICAL SECTION **38**

Financial Outlook Is Improving, by J. G. Lyne 38
Equipment Prices 44
$350,000,000 Increase in Railway Buying, by D. A. Steel 45
Railway Construction Shows Slight Upturn, by G. A. Boyd 51
More Increases in Railway Material Costs in 1936, by D. A. Steel 62
Locomotives Ordered in 1936, by W. J. Taft 70
Freight Cars Ordered in 1936, by F. W. Kraeger 73
Passenger-Train Cars Ordered in 1936, by F. W. Kraeger 79
Signal Construction Increased During 1936, by J. H. Dunn 83
Improved Service Is Feature of 1936 T. & T. Activity, by E. J. Phillips 89
Widespread Activity Features Motor Transport Year, by Charles Layng 91

NEWS **98**

The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service

POWER INTERLOCKING | C.T.C. | CAR RETARDER | AUTOMATIC SIGNALS | HIGHWAY CROSSING | CAB SIGNALS



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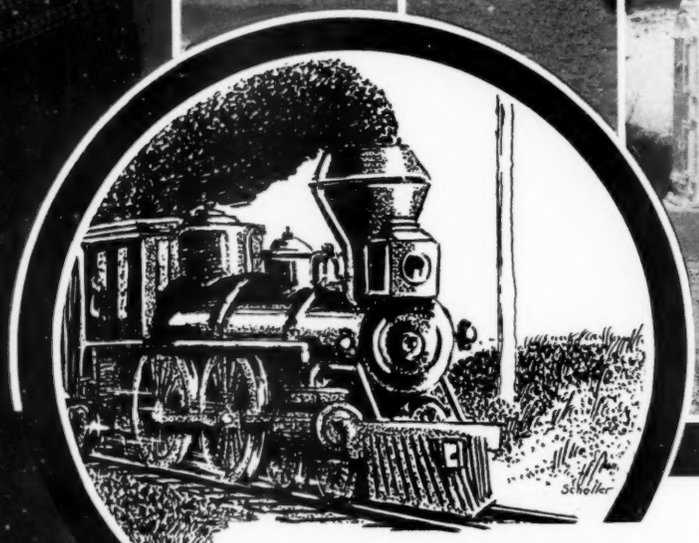

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The Year at a Glance

NATIONAL RECOVERY: The large increase in railway buying which has occurred as the result of larger net railway operating income is restoring employment and prosperity to many industries throughout the nation—so the leading editorial herein points out. It follows that legislative or administrative acts which would seriously reduce net railway operating income would retard national recovery, and no one in authority, with the national welfare at heart, could be a party to such socially destructive measures.

•

TRAFFIC INCREASES: Carloadings in 1936 were 14 per cent above those of 1935. Passenger-miles were up 19 per cent and passenger revenues almost 15 per cent. Gross revenues topped 4 billions, an increase of over 500 millions. These and other heartening comparisons are made by Dr. Julius Parmelee in his comprehensive review of 1936 railway operations, starting on page 4.

•

N. R. O. I. 645 MILLIONS: Net railway operating income, which is the determinant of how large a customer the railroads can be of other industries, rose 145 millions over 1935, as Dr. Parmelee's article further discloses—but the total was still 224 millions under 1930. This measures the improvement which must occur before railways will be restored to normal position as a source of employment in America's basic industries. Return on railway investment in 1936 was 2½ per cent.

•

NET 150 MILLIONS: For the railways as a whole, net income after the payment of fixed charges totaled 150 millions in 1936—which may be compared with 7½ millions in 1935. But this is a pretty puny profit on 4 billions of gross business; and, furthermore, net income in 1936 was only 28 per cent of that earned even in 1930.

•

533 LOCOMOTIVES: Orders for new motive power for service in U. S. were greater in 1936 than in any year since 1929 (page 70).

•

67,544 FREIGHT CARS: Railways' orders for freight service rolling stock last year likewise were greater than in any year since 1929 (page 73).

•

307 PASSENGER CARS: For passenger train service the 307 cars ordered in 1936, while a much larger total than for 1935, were nevertheless exceeded in 1934 and 1930 (page 79).

•

MOTOR USE INTENSIFIED: Railways greatly increased their activities in the field of highway transportation last year (page 91). Many bus and truck lines came under railroad control, and extension of c. and d. increased railroad participation in motor transport. At the same time, the trend is definitely toward direct railway operation of highway vehicles—rather than through the medium of contractors. 738 buses and 1,730 freight motor vehicles were ordered by railways and their affiliates in 1936. The use of motor vehicles for M. of W. and other non-revenue purposes is likewise rising continually.

•

43% MORE SIGNALING: Installations of new signaling in the U. S. and Canada in 1936 were up by this percentage in physical volume over those of 1935—details, page 83.

•

T. AND T. ACTIVE: Carrier-current, printing-telegraph and long-distance telephone circuit installations reached a five-year high in 1936 (page 89), reflecting the modernity in communications which modernity in railroad speed and service requires.

•

A. AND B. TO RISE: Railways will spend at least 20 per cent more on additions and betterments in 1937 than they did last year. This is disclosed in a survey of typical A. and B. programs, beginning page 12, which also discloses for what things the railroads propose to spend their money.

•

BARGAINS GROW: By offering a better service for less money railroads are winning back both freight and passengers. An article, page 16, surveys improvements —in speed, comfort, rate reductions, better equipment, c. and d.—of the year, showing their bearing on improved patronage.

•

A BUSY A.A.R.: The Association of American Railroads has completed its second year. The manifold services it performed for the industry in 1936 are outlined, page 21, in details which, we suspect, will enlighten many—perhaps indeed most—railroaders.

•

EQUIPMENT RESERVE ZERO: While there are still some reserves of cars and locomotives, the zero mark is uncomfortably near at hand. The situation is analyzed, page 25, for each class of equipment, by our mechanical editor.

•

M. OF W. 455 MILLIONS: Railroads spent 16 per cent more on maintaining roadway and structures in 1936 than in 1935, and the trend points upward for the coming year—details in a survey by our engineering editor, page 28.

•

AS CUSTOMERS: Railroads spent 727 millions with manufacturers last year—up 325 millions over 1935, as outlined beginning page 45.

•

PRICES RISING: Prices of almost all the things the railroads buy are on their way up (see page 62 for details). Weighted average of all the increases runs about 15 per cent above the depression low point.

CONSTRUCTION LOW: Railway construction, in contrast to practically everything else in the industry, touched the lowest point in history in 1936—whether measured by volume or expenditure. But, the survey (page 51) shows, there are signs of revival; and abandonments have eased off too.

•

CANADA GAINS: Canadian railways shared in the 1936 upturn, but they are having difficulty in keeping operating expenses from swallowing up all their increases—so our Ottawa correspondent reports, page 32, with statements also from the chief executives of the Dominion's two principal railways.

•

PEAK IN MEXICO: Traffic on the National Railways in the first nine months of 1936 reached an all-time record, surpassing even 1929—details, page 36. Viva Mexico! And we hope it's contagious.

•

NEW FINANCING: Money for new equipment can be had at lower interest rates than at any time in history—and a revival has set in in the sale of railway securities. The survey of financial developments, page 38, also discloses heavy repayments to R.F.C. and very little change in receiverships and bankruptcies during the year.

•

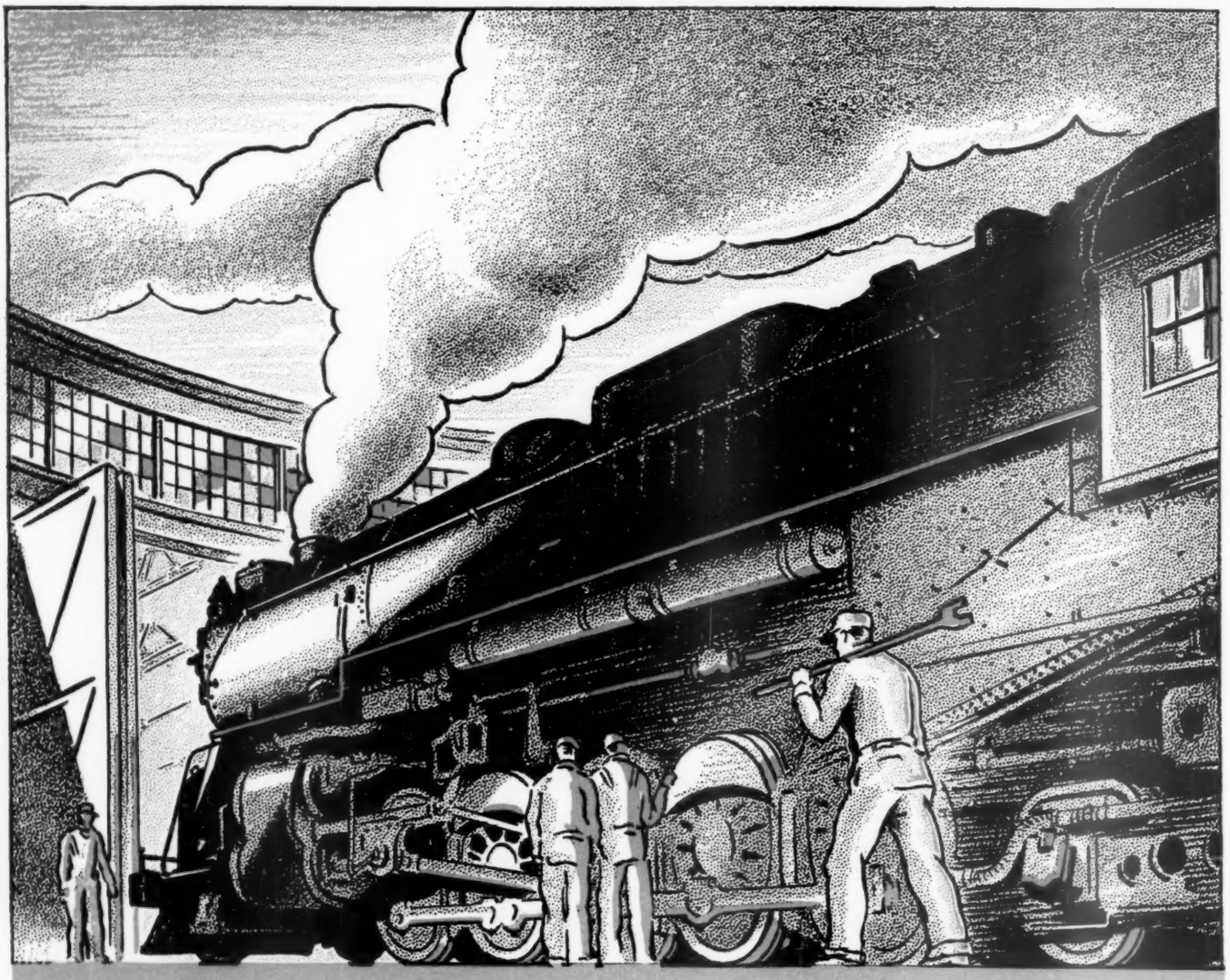
REVOLUTION IN PICTURES: If anyone doubts that a revolution in the appearance of the railroads is occurring, we believe the illustrations in this issue will remove those doubts. Look at the articulated *locomotives* on pages 20 and 27; the new Southern Pacific passenger locomotive, page 70 (a brand new picture of a brand new engine), as well as other new *passenger power and equipment* illustrated on pages 16-19, 25, 32, 35, and 79-81; *switch engines*, pages 50 and 72; modern *construction methods*, page 51; *signaling*, pages 83 and 85; *freight cars*, page 74; *material handling*, page 74; and *motor installations*, page 91 et seq.

•

YEAR END EQUIPMENT: The last week in the year has been one of outstanding news in inquiries for new equipment, as well as some sizeable orders. Details are given in the Equipment and Supplies columns in the news pages herein.

•

REGULATORY FAILURE: Since 1910 when effective regulation of railways began, the average price of their stocks has declined 54 per cent, while the average price of the stocks of unregulated industries has advanced 90 per cent. Meantime railway rates are much higher than they were in 1910. Regulation has been a failure from the standpoint of railway owners and its benefits to shippers are, at best, questionable—this being another aspect of important national economic questions discussed in the leading editorial article herein.



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The Railways — Retrospect and Prospect

The railroads have just finished their most successful year since the first year of the depression—1930. They have entered the year 1937 with good prospects. Not only they and their employees, but industry and its employees have benefited from the increases of railway gross and net earnings last year. They will all continue to benefit from them in 1937 unless these increases are retarded or arrested by influences not now in operation.

The most outstanding development in the field of transportation in 1936 was the large increase of railway buying of equipment and materials. In order to show *current* activity in railway purchasing from the manufacturing industry the *Railway Age* has adopted a practice of combining (1) estimates of the approximate value of the *orders* placed month by month for equipment and (2) data furnished to this paper by the railroads showing the value of *materials currently received* by them. Statistics arrived at in this way are comparable with themselves month by month and year by year, but not comparable with any other statistics compiled regarding expenditures for maintenance and capital account. Furthermore, for reasons given in an article elsewhere in this issue, they are not complete. One of these reasons is that they do not include purchases made from manufacturers by contractors doing construction work for railways.

The purchases made by the railways directly and indirectly from manufacturers are therefore substantially larger than our current estimates of railway buying. But estimates made in the way stated do, better than any other statistics available, serve their particular purpose—viz., that of indicating *currently* the volume of railway buying being done as compared with the amount done in previous corresponding periods.

Equipment and Material Buying over $700,000,000

The *Railway Age's* estimate of railway buying of equipment and materials from the manufacturing industry in 1936—arrived at in the way indicated—is $727,000,000, an increase of $325,000,000, or 80 per cent over 1935. The estimated cost of the equipment ordered in 1936 is $192,000,000, an increase of about 420 per cent over the cost of that ordered in 1935. The cost of materials received by the railroads from the manufacturing industry was about $535,000,000, an increase of $170,000,000, or almost 50 per cent.

Comparable figures of total buying of equipment and materials from the manufacturers in 1929 and the depression years are as follows: 1929, $1,428,000,000; 1930, $876,000,000; 1931, $488,000,000; 1932, $271,000,000; 1933, $273,000,000; 1934, $464,000,000; 1935, $403,000,000. It will be seen that these purchases in 1936 were much larger than in any year since 1930. The value of the orders placed for equipment was $54,000,000 larger than in 1930. It was also $51,000,000 larger than in the entire five years 1931-1935, inclusive. Purchases of materials were smaller than in 1930, but much larger than in any year since. More detailed statistics are given elsewhere in this issue.

Effects of Increased Net Operating Income

The explanations of this increase in railway buying are simple and should be obvious, but are nevertheless exceedingly important. First, during the preceding years of depression there had occurred a deterioration of railway properties owing to inadequate maintenance and a huge decline in the number of locomotives and cars actually in existence. There was great need for a large increase in railway buying, especially of equipment, which was strongly emphasized by a small but real shortage of freight cars at the peak of traffic in the fall of 1936. Second, there occurred during the latter half of 1935 and throughout 1936 a substantial increase of net operating income which afforded railways the means of increasing their buying.

The dependence of railway buying upon net operating income often has been emphasized in these columns. It never was more strikingly demonstrated and illustrated than within the last year. Net operating income of about $645,000,000 was the largest since 1930. Consequently railway buying of about $727,000,000 was the largest since 1930.

What are prospects of railway earnings and buying for 1937? They were somewhat clouded by the decision of the Interstate Commerce Commission on December 18 declining to allow the "emergency freight charges" to remain in effect beyond December 31, 1936. The railways estimated that, based on the current volume of freight traffic, they were deriving about $10,000,000 per month of net revenues from these charges. Their discontinuance will adversely affect net operating income in 1937. But this does not mean that net operating income will be less than in 1936.

The railways had in 1936 increases of about 14 per cent in freight car loadings and of 19 per cent in pas-

senger traffic. This resulted in an increase in gross earnings of about $550,000,000. In spite of large increases in expenditures for maintenance and in taxes it also resulted in an increase of about $145,000,000 in net operating income. Traffic is still growing at an accelerating rate. Freight loadings in the first half of 1936 were 66½ per cent as large as they averaged in 1925-1929, inclusive; in the second half of the year, 71 per cent; in December, 80 per cent. If they should be only as large relatively throughout 1937 as they were in December they would be 16 per cent larger in 1937 than in 1936. Even allowing for the loss of the emergency charges, this would make freight revenues in 1937 about $500,000,000 larger than in 1936. Passenger earnings also will increase. In the absence of an abnormal increase of operating expenses a substantial increase in net operating income would result in spite of withdrawal of the emergency charges.

Demands of Labor Unions

The most threatening cloud hanging over railway prospects is the movement of railway employees for advances in their wages, and especially for legislation by Congress to establish a 6-hour working day at 8 hours' pay. Various estimates based upon operating conditions and number of employees in different years have been made as to how much the proposed 6-hour legislation would increase operating expenses. These range for the Class I roads alone from $300,000,000 annually in the worst depression years upward to the Interstate Commerce Commission's estimate of $547,000,000 for 1930 and to the railways' own higher estimate for that year. All the estimates indicate that if demands for railway service should become normal because of complete recovery of business the proposed legislation, if applied as contemplated by its advocates, would make annual operating expenses at least $500,000,000 larger than they otherwise would be. For reasons previously stated in these columns, it would be difficult or impossible for the railways financially to stand such an increase in expenses without a large advance in freight rates, and it is questionable how effective an advance in rates by the railways alone could be made even if authorized by the Commission.

What Will Government's Attitude Be?

It is far from certain, or even probable, however, that any legislation so enormously increasing operating expenses will be passed. The Interstate Commerce Commission's recent decision regarding emergency freight charges shows that one government body does not believe that the shipping public should be required to pay higher rates. The attitude of the Commission regarding rates as shown by its decision in this case plainly should not be disregarded by President Roosevelt and Congress in considerating proposed legislation to increase operating expenses.

Fortunately, there seems good reason for believing that the President does not favor this legislation. It was understood during his campaign in 1932, and has been understood ever since, that he is opposed to government ownership; and he can hardly fail to see the plain tendency of such legislation to cause a crisis that might precipitate government ownership. He is anxious for a continuance of recovery. It is largely dependent upon continuance of the increase of railway buying now occurring; and he can hardly fail to see that legislation greatly increasing operating expenses and drastically reducing net operating income would almost stop railway buying.

Extent of Railway Recovery

It must be evident to anybody who studies the facts that while the recovery of the railways and industries dependent on them for a market is well started, it is only well started. Railway gross earnings of approximately four billion dollars in 1936 were considerably less than two-thirds as large as the average annual gross earnings earned in the five years ending with 1929. Total maintenance expenditures of about $1,240,000,000 were the largest since 1931, but 45 per cent less than they averaged in the pre-depression years. Even purchases of equipment and materials, in spite of their large increase, were only one-half as large as in 1929. Orders for 533 locomotives were larger than they totaled in the entire five years 1931-1935, inclusive, but were less than one-third as large as the average number ordered annually during the five years following 1921. Orders of 67,544 freight cars were larger than the total orders placed in the five years 1931-1935, inclusive, but smaller than the orders placed in any year between 1921 and 1931, excepting 1926, 1928 and 1930.

Railway construction in 1936, measured either by volume or expenditure, reached the lowest level in history; but there were unmistakable signs that it was beginning to revive. Beginning in 1935 appropriations were made by the federal government for the entire cost of grade separations; and federal appropriations made for this purpose total $146,000,000 and cover 1,886 grade separation projects. During last year 1,364 such projects were under way or completed.

There were built 93 miles of new line—about twice as much as in 1935. Meantime, the abandonment of old lines continued, although not quite as rapidly as in 1935. The total mileage abandoned was 1,523. This was the fifth consecutive year that abandonments exceeded 1,000 miles. They aggregated 1,452 miles in 1932; 1,876 miles in 1933; 1,995 miles in 1934; 1,843 in 1935—a total in five years of 8,689 miles. The new mileage built meantime was 401 miles.

The demands of traffic will increase more in 1937 than they did in 1936 if improvement in general business continues at an accelerating rate. The railways, to be able to meet the demands satisfactorily, will have to make larger maintenance and capital expenditures than last year. The shipping public strongly opposed extension of the emergency freight charges. If business continues to improve it may within a year be complaining more loudly about inability of the railways

satisfactorily to handle freight than about any small difference in freight rates.

Effect of New Taxes on Net Operating Income

One significant and important fact about railway results in 1936 which has attracted little attention is the extent to which they were affected by new security legislation recently passed by Congress. Net operating income increased from about $500,000,000 to $645,000,000, or about 30 per cent. But charges of about $60,000,000 were made in the accounts for social security and retirement taxes that must be paid if the legislation imposing them is upheld. Excepting for these new federal taxes, the net operating income reported would have been about $705,000,000, or more than 40 per cent greater than in 1935. New taxes, therefore, approximated a 10 per cent levy upon net operating income.

This tax legislation was passed by Congress for the benefit of the working class, and the railway retirement legislation, which was responsible for two-thirds of the increase in railway taxes, for the especial benefit of railway employees. The employees of the railways are now being paid the highest average hourly wages in history. If this new federal tax legislation is upheld by the courts they will also have the benefit of new taxes derived from the railways amounting to about 3½ per cent of the total payroll. Such facts surely should and will be considered by the President and Congress in deciding whether legislation greatly to increase labor costs and operating expenses should be passed when the railways are only beginning to recover and their gross earnings are still only two-thirds as large and their net operating income less than one-half as large as before the depression.

Effects of Regulation on Railways and Other Industries

It is now unprecedentedly difficult to forecast business in general, including railroad business, and the returns that probably will be derived from railway operation. The reason is that government influence on business is greater than ever before. The way in which this increased government influence is used will in future not only largely determine the ratio between railway gross earnings, on the one hand, and operating expenses and taxes, on the other hand, but will also largely determine the gross earnings, for what government decides to do affecting industry and agriculture will largely determine the total volume of production and commerce and, therefore, the volume of railway traffic.

The railways have been subject to effective government regulation since 1910. Other industries are only beginning to become subject to it. It is worth while, therefore, to compare the changes that have occurred in the market prices of the securities of the regulated railroads during the last twenty-six years with the changes that have occurred in the market prices of the securities of unregulated industrial companies. The Dow-Jones averages of railroad and industrial security prices allow for the effects produced by stock dividends and, therefore, make such comparison possible. The highest average price of railroad stocks reported by Dow-Jones in any month of 1910 was $130, and the highest average price of industrial stocks reported in that year was $98. The highest average price of railroad stocks reported in 1936 was $59.85 and the highest average of industrial stocks was $184.90. The maximum average for railroad stocks in 1936 was 54 per cent *lower* than in 1910, while the maximum average for industrial stocks was 90 per cent *higher*.

The Purposes of Regulation

What has been the purpose of railway regulation? It was adopted originally to stop unfair discrimination in rates. The Mann-Elkins Act passed in 1910 empowering the Interstate Commerce Commission to suspend and annul proposed advances in rates was plainly intended to prevent both railway rates and railway profits from becoming excessive. Freight rates are much higher now than then, but railway profits are both relatively and absolutely much lower. This is because railway operating expenses, and especially labor costs, have been advanced while normal increase in the volume of traffic has been prevented by government policies in aid of competing carriers.

What will be the purposes and effects of increased government regulation of other industries? The government is engaging in the regulation of both their prices and labor costs. One avowed purpose is the prevention of future depressions. Another obvious purpose is the curtailment of profits by forcing advances in wages and by levying increased taxes ostensibly in the interest of both employees and the public. Will the ultimate effects upon industrial profits and security prices be similar to those that have been produced on railway profits and security prices?

Economic Conditions Highly Favorable

The future effects of the new government policies already adopted are speculative. The future effects of other government policies of similar character having the same objectives are much more speculative because at present nobody knows what these policies will be. The student of economics and business can at present express only one opinion with complete confidence. This is that existing economic conditions are highly favorable for a continued large expansion of production and commerce, and, therefore, highly favorable for a continued large expansion of railway gross earnings, railway employment, railway net operating income and railway buying. Government can adopt policies that will retard or arrest the recovery that has occurred so rapidly within the last eighteen months. It can, on the other hand, adopt policies that will permit this recovery to continue until the total volume of production, commerce and employment, and the income derived from them by each and every class of the people will far surpass all previous records.

A Review of Railway Operations in 1936

Railroads participate partially in recovery—Prospects for 1937 dependent on government policies

By Dr. Julius H. Parmelee

Director, Bureau of Railway Economics

RAILWAYS participated in the business recovery that quite generally occurred throughout the United States during the year 1936. While the measure of recovery, so far as concerns the rail industry, was a partial one, and while the index of rail traffic still showed a lag behind the general index of distribution, yet it was sufficiently extensive to give the year a brighter hue than any year since 1931. In fact, railway revenues in 1936 began to approach the totals earned in 1931, and gave some cause to hope that they would surpass the 1931 level in 1937. This hope, of course, was based on the expectation that the rise in traffic, which was more pronounced in the second half of 1936 than in the first half, would continue into next year.

On the other hand, the decision of the Interstate Commerce Commission on December 19, declining to continue beyond December 31, the emergency freight charges authorized by it in Ex Parte 115, challenged that hope, and will make a rise in traffic necessary in 1937, if only to maintain the same level of gross earnings as in 1936. To make up the net earnings that are now lost, because of this decrease in rates, the carriers must needs handle at least ten per cent more freight traffic.

To indicate the partial nature of railway recovery in 1935 and 1936, we emphasize that while total revenues in 1936 were nearly a billion dollars greater than in 1933, they were more than a billion dollars less than in 1930, and more than two billion dollars less than in 1929. Revenues are on the climb, but still have a considerable distance to go.

Beginnings of recovery were discernible as early as 1932, but the general upward trend in traffic began in 1933. This may be seen on Chart B which shows an irregular rise in carloadings through 1933, a leveling off through 1934, and a generally upward trend from the middle of 1935 to the end of 1936.

A number of items of expense showed rising trends in 1936, over and above those due to increased traffic. Restoration of the ten per cent wage reduction, which was finally completed on April 1, 1935, was effective throughout the whole year 1936 for the first time. Prices of materials were generally upward. Taxes under Title IX of the Social Security Act, for unemployment insurance, became effective at the beginning of 1936, while the railroad retirement tax went into effect on March 1 of that year.

No railway corporation of any importance filed application for receivership or trusteeship in 1936. Despite this fact, about 40 per cent of the total mileage still operated in the red during the year.

Progress in efficiency and service continued during the year, and further advances will be made. Increased amounts expended by the railways for maintenance work in 1936 represented definite progress in the attack on deferred maintenance.

What the year 1937 will produce, in addition to a higher level of traffic, will depend largely on three factors: the trend of rates, the trend of prices, and possibilities in the legislative field. Much will depend on the as yet undisclosed policies of the administration at Washington, which returns to power with a large popular majority behind it, and with an overwhelming control of both houses of Congress.

Legislation

The Pettengill bill, to repeal the long-and-short-haul clause of the Interstate Commerce Act, passed the House by a large majority in March, but did not come to a vote in the Senate before the close of the session. It will receive further consideration during the sessions of the 75th Congress, which convenes for the first time in January, 1937.

The water carrier bill, designed to regulate port-to-port rates of inland and coastwise carriers by water, and in other ways to bring them under federal regulation, did not come to a vote in either house last year, although it received committee hearings in the House of Representatives. This measure, too, will probably receive consideration from the 75th Congress.

Two railroad retirement bills enacted by Congress in 1935—the railroad act and its companionate tax act—were reviewed by Justice Bailey of the District Court for the District of Columbia, who in June, 1936, found the tax act invalid, and enjoined government collectors from levying or collecting the tax on payrolls. This tax, which the act made effective for the year from March 1, 1936, to February 28, 1937, amounts to 3½ per cent on the employer and 3½ per cent on the employee, or 7 per cent in all, and is calculated on all wages and salaries not exceeding $300 per month. As a matter of precaution, the majority of the carriers are witholding the employee tax and charging their own portion of the tax to tax accruals.

Meanwhile, Congress had appropriated $46,620,000 to the Railroad Retirement Board, created by the retirement act, with which to pay annuities. To the end of 1936, the Board had made about 2,100 annuity grants, totaling about $1,500,000 per year.

Validity of both these acts has been appealed to the higher courts for final adjudication.

No so-called "labor bill" was enacted by Congress during its 1936 session, although a number of such bills

received attention through the medium of committee hearings.

Railway brotherhoods announced late in 1936 that they proposed to push to enactment the six-hour bill that has been before Congress for several years. At the same time, other labor bills are likely to be reintroduced in Congress, including full-crew and train-limit bills. On the basis of present employment and railway payrolls, the six-hour day, if legislated by Congress, would add about $400,000,000 to the annual cost of railway operations. To whatever extent this burdensome and immediate addition to costs would be offset by mechanization of work, future employment would be reduced.

Two voluntary agreements between carriers and representatives of their employees were formally concluded in 1936, and were achievements in the field of industrial relations. One was the so-called wage dismissal agreement, which provided that where an employee is displaced because of the co-ordination of facilities of two or more carriers, he shall receive a "co-ordination allowance", amounting to 60 per cent of his usual rate of pay, for periods of from 6 to 60 months, according to his length of service.

The other agreement laid down a schedule of installations of power reverse gears on locomotives, which contemplated such installation on all new locomotives, and a gradual installation on existing locomotives of certain weights and types, up to the year 1942. As a result of this agreement, the brotherhoods undertook to withdraw their application to the Interstate Commerce Commission for the issuance of orders to the carriers to install power reverse gears. This application had received extensive hearings before officials of the Commission.

Nevada enacted a train-limit bill in 1935. The validity of that act being attacked, extended hearings were held in 1935 and 1936 before a Special Master, who, in November, 1936, recommended a finding of unconstitutionality.

Similarly, Louisiana enacted a train-limit bill in the summer of 1936, enforcement of which has been held up by injunctive process.

Material and Supply Costs

Material prices showed only slight changes during the year 1935, but exhibited a tendency to increase during 1936. The general index of materials other than fuel, which had shown an average of 117.4 at the end of 1935 (the average for May, 1933, being 100), stood at 120.4 in October, 1936. The cost of coal to the carriers in October, 1936, including freight but excluding handling charges, averaged $2.23 per ton, compared with an average of $2.27 throughout the year 1935, while fuel oil per gallon cost 2.1 cents in October, compared with an average of 1.8 cents during 1935.

Prices of iron and steel were quite generally increased by the manufacturers on December 1, 1936, the increases ranging upwards of five per cent for the most part. Steel rail, a large item in the railway purchase budget, went from $36.375 to $39 per ton, or 7.2 per cent.

Compared with the base prices of 1933, and taking purchases in 1936 as a basis of calculation, the annual increase in fuel and material costs to the railways, because of rising price levels, is estimated at a minimum of $125,000,000.

Rates and Fares

Emergency freight charges on certain commodities, authorized by the Interstate Commerce Commission in Ex Parte 115, became effective on April 18, 1935, and were to expire by limitation on June 30, 1936. On petition from the carriers that they be continued beyond June 30, without expiration date, the Commission held hearings, as a result of which it authorized an extention of the charges, with some modifications, for six months to December 31, 1936. The Commission reduced the maximum charge on bituminous coal from 15 cents per ton to 10 cents per ton; on iron ore, from 10 cents per ton to 8 cents per ton; some charges, as on peanuts and tobacco, were eliminated.

In its decision in Ex Parte 115, as in earlier rate reports, the Commission suggested that general increases in rates by imposition of emergency charges was a less preferable method of adjusting rates than to determine those commodities able to carry increased rates (as well as those entitled to lower rates), and make the adjustments in permanent tariff form. The Commission said, in particular (208 I. C. C. 63):

> In this process of gradual change, it is equally desirable to subject the rate structure to the most detailed analysis, for the purpose of discovering where it now repels or impedes traffic, where reductions can be made which will by their effect on traffic increase aggregate revenues, and where increases are possible which industry and traffic can bear without harm. We know of nothing more important to the railroads than such intensive studies.

Acting on suggestions of this type, the carriers in October, 1936, initiated a series of changes in certain of the permanent tariffs, designed to bring about some reductions and some increases. The effort of the carriers, to use the language of their application, was "to bring about a revision of the rate structure to meet present-day conditions and to avoid the enormous decrease in railway revenues which would otherwise follow the expiration of the emergency charges. . . . The proposed changes, in the aggregate, will result in a lower level of rates than the level of existing rates, including emergency charges," and are regarded as an important forward step in simplification of tariffs. After consideration of this application, and after securing the reactions of shippers, the Commission set the matter for formal hearing in January, 1937.

Upon adoption of this program, the carriers requested authority to continue existing emergency charges beyond December 31, 1936, but only for such period as would include definite action of the Commission on the permanent changes referred to. After three days of oral argument on this request, the Commission denied it by a majority decision on December 19. The nine members who joined in the denial took the position that the emergency period had passed, and that it would be almost a breach of faith with the shippers to permit further extension of the charges. The minority members emphasized the need of the carriers for additional funds with which to bring their plants into safe and satisfactory condition.

So the emergency charges, first instituted on April 18, 1935, and extended from July 1, 1936 with modifications, finally expired by limitation on December 31, 1936.

According to the best information available in the files of the Bureau of Railway Economics, railways of Class I derived the following revenues from these emergency charges, during the period they were in effect:

April 18- Dec. 31, 1935	$74,400,000
January 1-June 30, 1936	58,500,000
July 1-Dec. 31, 1936	60,000,000
Total	$192,900,000

This was a monthly average of $9,400,000 for the

whole period, or an annual average of $112,800,000. The amount of the charges in 1936, or $118,500,000, supplied four-fifths of the total amount of net income earned by the carriers in that year. Many of the companies would have earned no net income in 1936, had it not been for these revenues.

The passenger fare investigation, initiated by the Interstate Commerce Commission in 1934, closed with a decision rendered on February 28, 1936, setting maximum fares of two cents per mile in day coaches, three cents per mile in Pullman cars, and eliminating the Pullman surcharge. These became effective on June 1, 1936.

As many of the passenger rates in the West and South were down to or below these levels, the Commission's decision affected the Eastern lines for the most part. Some of these lines handle large proportions of the rail passenger traffic of the United States.

It is yet early to appraise the full effect of this decision on railway passenger traffic and revenue, especially in the East. It will always be difficult to make such an appraisal, even after the passage of time, because so many collateral factors enter the equation, such as improvement in national economic conditions, increased attractiveness, comfort and speed of passenger service, and the like. In fact, no definitive conclusion could be reached, without knowing what would have happened had the decreases in fares not been made, and that knowledge lies in the realm of speculation. The following comparisons throw light on the question, but do not settle it.

Taking the five months immediately preceding the effective date of the passenger fare decision, and the five months immediately succeeding that date, the trends in passenger revenue (in terms of increase over the corresponding periods of 1935) were as follows:

Five months, January 1 to May 31:	
East	9.8%
West and South	17.3%
Five months, June 1 to Oct. 31:	
East	14.4%
West and South	22.5%

Senate Finance Investigation

Senate Resolution 71 authorized the Senate Committee on Interstate Commerce in 1935 to investigate the field of railway financing, and appropriated $25,000 for the purpose. A further resolution in 1936 (S.R.227) authorized the committee to continue the work beyond the close of the 74th Congress, with an additional appropriation of $75,000. The original resolution provided that the Federal Co-ordinator of Transportation should select and supply to the committee a list of railroads to be included in the investigation. This he did, with lists of 25 systems.

Investigators employed by the committee were busy throughout 1936 examining railway and other files, assembling data, and preparing reports, and hearings opened December 7 before a subcommittee of the Senate Committee, with Chairman Wheeler as presiding officer. Two weeks were devoted to the Van Sweringen group of companies, and the hearings then adjourned to January.

Motor Carrier Act

The Bureau of Motor Carriers of the Interstate Commerce Commission was occupied during 1936 in completing its organization, scheduling hearings on many applications for certificates and permits, meeting requests for rulings and interpretations, and paving the way for regulation of liability insurance, rate classifications, passes, and other requirements. Because of inadequate appropriations, the Bureau found itself unable to cover the whole field of its eventual duties, especially those relating to statistics and accounts. This delayed the date when comprehensive and accurate information regarding motor carrier operations can be secured and made available.

Several hundred applications for motor carrier certificates and permits were decided during 1936. Survey of some 200 of these indicates that the majority were granted, with or without conditions or modifications, while the remainder were denied, dismissed, cancelled, or assigned for further hearing.

Federal Co-ordinator of Transportation

After two extensions of one year each, the office of Federal Co-ordinator of Transportation expired on June 16, 1936, and Mr. Eastman returned to his seat at the council table of the Interstate Commerce Commission. Some of his studies of labor conditions and of transportation subsidies, left incomplete, are being issued from time to time as they are brought to a close.

The Federal Co-ordinator's recommendation that his office be made permanent did not receive favorable action from Congress. The Interstate Commerce Commission itself neither endorsed nor opposed the proposal, but did suggest to Congress, on January 21, 1936, that the provision that the Co-ordinator may call upon the Commission for staff assistance be deleted, adding that such an arrangement, if permanent, would result in decreasing the efficiency of the Commission in discharging its own responsibilities.

The Association of American Railroads took over for further review the co-ordination projects of the Federal Co-ordinator, and committees of that association are engaged upon the task, developing the possibilities of savings and economies therefrom.

Improvements in Service

Passenger service improvements continued throughout 1936, with speeding up of some trains, additional streamlined schedules, and an increased number of air-conditioned cars.

Excursions to football games and other sports, bike-and-hike trains, "off-the-beaten-track" excursions, ski trains, and visits to railroad roundhouses, shops and terminals, were operated in increasing numbers. Modernization of old equipment, as well as introduction of new equipment also characterized the year's improvements.

Freight train speed attained almost the same high average as in 1935, in spite of the increased number of trains in operation.

Collection and delivery of freight was extended to virtually a nationwide basis. The Interstate Commerce Commission suspended the C.D. rate schedules of Eastern carriers in the spring, but approved them in the autumn. After being attacked in two court proceedings, both of which failed, the schedules became effective on November 16.

Another development was approval by the Commission of tariffs for the transportation of loaded and empty motor trailers by rail, loaded onto flat cars.

The Equipment Research Division of the Association of American Railroads initiated in March its research in air conditioning of railroad equipment. Efficiency tests of air-conditioning systems used by railways in the United States and Canada were made in railroad,

Pullman, and university laboratories. Through co-operation of 29 railways, a carefully planned road program to provide data not obtainable in laboratory tests was inaugurated. Investment in air-conditioning equipment, and costs of operation and maintenance, were also studied. The results of these studies of air conditioning as a factor in passenger comfort will appear in a report early in 1937. In round figures, 8,031 cars have been air-conditioned in the United States and Canada so far, at a cost of $45,000,000.

The advertising program of the railways, individually and through the Public Relations Division of the Association of American Railroads, has presented improvements to the public in a dramatic and effective way through magazines, folders, and other distinctive ways. Railway supply firms have contributed folders and other material that likewise attracted and stimulated public interest in railroading in 1936.

Federal Aid for Highways

By the Act of June 16, 1936, Congress authorized the appropriation of $476,000,000 for the continuation in 1938 and 1939 of the broadened federal-aid program for highway improvement. This amount included the regular federal-aid appropriation of $125,000,000 for each of the two years. It also included $25,000,000 in each year for improvements to secondary roads, and $50,000,000 annually for "elimination of hazards to life at railroad grade crossings." The regular federal-aid appropriation, as well as that for secondary roads, is to be matched with state funds, but that condition does not apply to the appropriation for grade-crossing eliminations.

Appropriations authorized by the Act for various other classes of road work for each of the fiscal years 1938 and 1939 were as follows: $14,000,000 for forest highways, roads, and trails; $2,500,000 for main roads through public lands; $7,500,000 for roads in national parks and monuments; $10,000,000 for parkways; and $4,000,000 for roads on Indian reservations.

Since July 1, 1916, the federal government has appropriated a total of $3,744,065,205 in aid of highway improvements. Of that amount, $2,347,195,111, or 62.7 per cent, has been appropriated beginning with 1931.

Federal Aid for Waterways

Federal appropriations made or authorized for improvements of rivers, harbors, flood control and related projects in the United States up to June 30, 1936, aggregated $2,905,000,000. Of this amount about 34 per cent, or $989,000,000, has been appropriated during the past five fiscal years, 1932 to 1936.

The annual appropriation for each of the past five fiscal years follows:

1932	$147,000,000
1933	59,000,000
1934	309,000,000
1935	264,000,000
1936	210,000,000
Total	$989,000,000

Federal appropriations aggregated $210,000,000 for the year ended June 30, 1936. Of this amount, $190,000,000 was designated for maintenance and improvement of rivers and harbors, and $20,000,000 for flood control.

Federal aid to waterways has increased steadily since 1917, the average annual appropriations by five-year periods since that date being as follows:

1917-1921	$35,000,000
1922-1926	61,000,000
1927-1931	101,000,000
1932-1936	198,000,000

Railway Financing

The following brief summary of financial assistance rendered to railways may be made, the status being that of November 30, 1936:

Total loans (R.F.C. and P.W.A.)	$717,031,000
Repaid by railways	196,435,000
Balance, November 30	$520,596,000
Of which there had been sold to the public, at a net profit of $4,492,000	103,334,000
Still held by government	$417,262,000

The amount repaid by the railways during 1936 (to November 30) was $105,384,000, which exceeded the combined repayments of the three years from 1933 to 1935.

The Railroad Credit Corporation continued its liquidating payments during 1936 to participants in its pool. A total of 28 per cent was so distributed in 1936, bringing the cumulative total at the close of the year to 68 per cent.

Railways were able to finance their needs in the capital market during 1936, to a considerably greater extent than in any of the preceding four years.

Contributions to Economic Recovery

The railways in 1936 made a definite contribution to economic recovery. This may be measured in several ways. The average number of railway employees increased by more than 70,000 over 1935, and the payroll increased by $157,000,000. Purchases of materials and supplies increased by more than $150,000,000, while capital expenditures increased by more than $100,000,000. A large part of the capital outlay went for new rolling stock. Maintenance expenses showed an increase of $166,000,000.

Combined, these larger expenditures of the railway industry in 1936 meant more money put into circulation, more men employed, and more orders for factories and mills. To place any brake upon this movement in the near future, by means of burdensome legislation or otherwise, would mean a definite backward step on the pathway to normal business levels.

Receiverships and Trusteeships

Reorganization proceedings for a number of the larger companies in the hands of the courts continued through 1936, although none were brought to a conclusion. In some cases, hearings were still under way or contemplated at the close of the year. In other cases, reorganization plans were filed, often under court order, by one or more of the parties in interest. The process of reconstructing the financial setup of large corporations has proved a task of great magnitude, involving as it does the differing and sometimes conflicting interests of stockholders, creditors of different classes, the debtor companies, and the public.

Principal Operating Factors

The following summary presents the statistical results of railway operation in 1936, and compares those results both with 1935 and with 1930. A somewhat more detailed analysis of the several factors will follow. All the statistics in this and succeeding statements relate to railways of Class I, and all are subject to later revision, when final returns for the year 1936 become available.

1. Freight traffic (ton-miles) in 1936 increased 17.7 per cent over 1935, and was 13.4 per cent below 1930.

2. Passenger traffic (passenger-miles) increased 19.1 per cent over 1935, and was 18.0 per cent below 1930.

3. Operating revenues increased 16.0 per cent over 1935, while operating expenses increased 12.8 per cent.

4. Net railway operating income amounted to $645,000,000 in 1936, an increase of $145,000,000 over 1935, but a decline of $224,000,000 under 1930. The rate of return in 1936 was 2.5 per cent.

5. The net income after fixed charges is estimated at $150,000,000 in 1936, compared with a net income in 1935 of $7,539,127, and a net income of $497,000,000 in 1930.

6. The upward trend in these several factors was greater in the second half of the year 1936 than in the first half.

The Two Six-Month Periods

All of the principal factors of operation showed a greater rate of increase in 1936, over 1935, during the second half of the year than during the first half. This is indicated by the statistics of Table I.

Table I—Percentage of Increase, 1936 over 1935

Item	First six months	Second six months
Total operating revenues	14.5	17.3
Freight revenue	15.6	18.2
Passenger revenue	12.6	17.0
Total operating expenses	12.81	12.85
Net railway operating income	22.3	33.4
Car loadings	9.4	18.1
Revenue ton-miles	14.5	20.6
Revenue passenger-miles	15.8	21.0

The results for 1936, while encouragingly upward, were still far below former levels. To show this in a graphic way, Chart A is presented, relating to some of the factors included in Table I. For easy comparison, the six factors that appear in the chart are reduced to an index basis, the comparative figure for 1930 being taken in each case as 100.

The chart shows, as to all six factors, that progress was made in 1936, but that considerable further progress will be necessary before even approaching the levels of 1930. Total operating revenues, for example, were only three-fourths as great as in 1930. Maintenance expenses and net railway operating income were less than three-fourths. Net income was only about a quarter of the corresponding total for 1930. Freight traffic was one-seventh below, and passenger traffic nearly one-fifth below, the respective traffic totals for 1930.

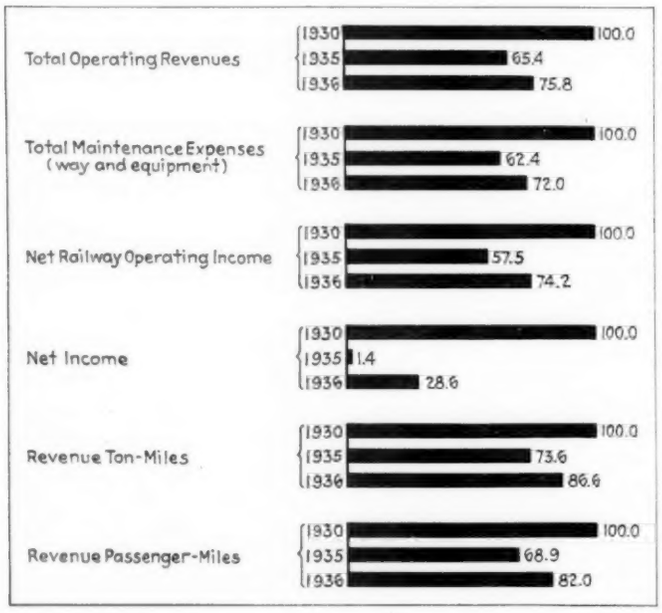


Chart A—Comparative Results, 1930, 1935, and 1936 (1930 = 100)

Traffic in 1936

Revenue carloadings began their upward trend in August, 1935, which continued uninterruptedly throughout the year 1936. As a result, the carriers experienced their best year in that respect since 1931. The thirty-six million cars loaded represented a gain of about 4,500,000 cars, or 13.9 per cent, over 1935.

The peak loading of the year occurred during the week of October 17, with 826,155 cars, compared with a peak of 734,154 cars in 1935. When loadings reached 807,070 cars in the week of September 26, it marked the first time since November, 1930, that loadings had attained a weekly level of eight hundred thousand cars.

Table II summarizes railway freight and passenger traffic in each of the years 1931 to 1936, compared with the five-year average, 1926 to 1930.

Carloadings in 1936 were greater than in any of the four preceding years, but were 3.4 per cent lower than in 1931, and 29.6 per cent below the five-year average. Revenue ton-miles exceeded each of the years from 1931 to 1935, but were 22.3 per cent under the five-year average. Passenger-miles were greater than in 1935, 1934, and 1933, but were less than in any year from 1901 to 1930.

Table II—Comparative Traffic Statistics

Revenue Carloadings (Thousands)	
1936	35,900
1935	31,518
1934	30,846
1933	29,220
1932	28,180
1931	37,151
Five-year average 1926-1930	50,974
Revenue Ton-miles (Millions)	
1936	332,000
1935	282,037
1934	268,711
1933	249,223
1932	233,977
1931	309,225
Five-year average 1926-1930	427,234
Revenue Passenger-miles (Millions)	
1936	22,000
1935	18,476
1934	18,033
1933	16,341
1932	16,971
1931	21,894
Five-year average 1926-1930	31,724

The increase of 19.1 per cent in passenger-miles in 1936 was accompanied by an increase of 14.8 per cent in passenger revenue. This was the third successive year in which both passenger revenue and traffic have increased over the preceding period.

Chart B shows a moving average of carloadings, on a relative basis from the beginning of 1930 to the end of 1936. The index for each month is the percentage ratio of the average loadings of a three-month period (of which that month is the central month) to the average loadings of the same three months during the five-year base period. The rising curve in 1935 and 1936 carried the index to a higher point—89.0—than at any time since the early part of the year 1931.

Loadings by Commodity Groups

Table III distributes the 35,900,000 cars loaded in 1936 among the eight principal commodity groups. The

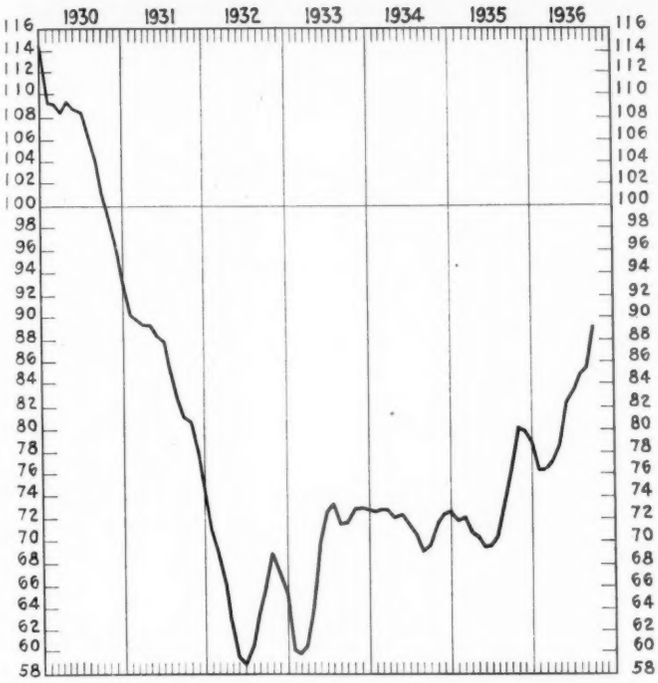


Chart B—Moving Average of Carloadings, 1930-1936 (Average 1928-1932=100)

percentage increase of each group appears in the second column.

Table III—Distribution of Carloadings

	Number (000)	Per cent increase 1936 over 1935	Per cent distribution 1936	Per cent distribution 1935
Grain and Products	1,795	13.8	5.0	5.0
Live stock	754	5.5	2.1	2.3
Coal	6,893	12.1	19.2	19.5
Coke	467	35.0	1.3	1.1
Forest products	1,687	22.0	4.7	4.4
Ore	1,651	61.2	4.6	3.1
Merchandise, L.C.L.	8,221	1.2	22.9	25.8
Miscellaneous	14,432	18.0	40.2	38.8
Total	35,900	13.9	100.0	100.0

All eight commodity groups increased in 1936, the percentage of increase ranging from a maximum of 61.2 per cent for ore down to a minimum of 1.2 per cent for merchandise, l.c.l. Ore, coke, forest products, and miscellaneous loadings increased at a greater rate than the overall increase of 13.9 per cent, while the greatest gain in number of cars occurred in loadings of miscellaneous freight.

Financial Results in 1936

Estimated financial results for 1936, shown in Tables IV to VII, are summarized from available monthly reports; the returns for earlier years are drawn from annual reports.

Table IV—Income Account

	1936 (millions)	1935 (millions)	1930 (millions)
Total operating revenues	$4,003	$3,452	$5,281
Total operating expenses	2,925	2,593	3,931
Taxes	303	237	349
Net railway operating income	645	500	869
Net income after fixed charges	150	8	524

Revenues, expenses, and net earnings all showed increases in 1936, and all were less than in 1930. Table IV summarizes the income accounts of railways of Class I for the years 1936, 1935 and 1930. The year 1930 is included in this and following tables, to supply a more nearly normal basis of comparison than that offered by any intervening year since 1930.

Total operating revenues in 1936 increased $551,000,000, or 16.0 per cent, while operating expenses increased $332,000,000, or 12.8 per cent.

The operating ratio stood at 74.4 per cent in 1930, increased to 75.1 per cent in 1935, and declined to 73.1 per cent in 1936. With revenues in each of the years 1935 and 1936 considerably below those of 1930, the operating ratio for the two years combined was slightly below that of 1930. This shows a continued control of expenses by the carriers, although with rising traffic and increased prices this result may no longer be possible.

The increase shown for taxes in 1936 is $66,000,000, or 27.3 per cent. A considerable part of this increase consisted of the railroad retirement tax, of which some $40,000,000 was charged during the ten months from March 1 to December 31, and the Social Security unemployment insurance tax of $18,000,000. Some of the carriers did not accrue the railroad retirement tax, the total of which for all Class I railways averaged about $5,000,000 per month.

Net railway operating income amounted to $645,000,000 in 1936, an increase of 29.0 per cent over 1935, but less by 25.8 per cent than in 1930.

Net income after fixed charges is estimated at $150,000,000 in 1936, compared with a nominal net income in 1935, and with net deficits in each of the three years from 1932 to 1934.

Operating Revenues

All classes of operating revenue increased in 1936, and all were considerably lower than in 1930. Table V compares the principal items of railway revenue in 1936, 1935, and 1930.

Table V—Operating Revenues

	1936 (millions)	1935 (millions)	1930 (millions)
Freight revenue	$3,264	$2,791	$4,083
Passenger revenue	411	358	730
Mail revenue	95	92	111
Express revenue	58	53	115
All other	175	158	242
Total	$4,003	$3,452	$5,281

Freight revenue, the largest revenue item, showed an increase of 16.9 per cent over 1935.

Operating Expenses

Every class of operating expenses also increased in 1936. Table VI compares the principal items of railway operating expenses in 1936, 1935, and 1930.

Table VI—Operating Expenses

	1936 (millions)	1935 (millions)	1930 (millions)
Maintenance of way	$456	$394	$706
Maintenance of equipment	786	682	1,019
Traffic	100	94	128
Transportation	1,396	1,253	1,848
General and other	187	170	230
Total	$2,925	$2,593	$3,931

Transportation expenses increased $143,000,000, or 11.4 per cent, 1936 over 1935. Maintenance of equipment increased $104,000,000, or 15.2 per cent, while maintenance of way increased $62,000,000, or 15.7 per cent.

Combining the two maintenance accounts, they totaled $1,242,000,000 in 1936, which represented an increase of $166,000,000 over 1935. While this was caused in part by increased price levels, and while it was $483,-

000,000 less than the corresponding expenditure for maintenance in 1930, yet the figure shows considerable progress toward meeting the problem of deferred maintenance, both in fixed plant and in equipment. This is further borne out by the fact that the percentage of unserviceable locomotives and freight cars declined during the year: as to locomotives, from 21.8 per cent at the end of 1935 to 17.6 per cent on December 1, 1936; as to freight cars, from 14.9 per cent at the close of 1935 to 12.5 per cent on December 1, 1936.

Net Railway Operating Income and Rate of Return

The rate of return showed some improvement in 1936, rising above the two per cent level for the first time since 1930. That a rate of 2½ per cent, or thereabouts, is nowhere near a fair return, will be generally recognized and realized. Table VII shows for a period of ten years, 1927 to 1936, the total amount of net railway operating income and the rate of return on property investment.

Table VII—Net Railway Operating Income and Rate of Return

	Net Railway Operating Income (000)	Per Cent		Net Railway Operating Income (000)	Per Cent
1936	$645,000	2.50	1931	$525,628	2.00
1935	499,819	1.94	1930	868,879	3.30
1934	462,652	1.79	1929	1,251,698	4.84
1933	474,296	1.83	1928	1,172,864	4.65
1932	326,298	1.25	1927	1,067,985	4.30

The rate of return on property investment in 1936 was 2.5 per cent compared with 1.9 per cent in 1935 and 3.3 per cent in 1930. The corresponding rates of return for the three districts in 1936 were: Eastern District, 3.0 per cent; Southern Region, 2.3 per cent; Western District, 1.7 per cent.

Revenue per Traffic Unit

Slight decreases occurred in 1936, in average revenue per ton-mile and average revenue per passenger-mile, the general trend of both those averages since 1921 having been downward. Revenue per ton-mile declined, during the fifteen-year period from 1921 to 1936, by 22.8 per cent, while revenue per passenger-mile declined 40.1 per cent during the same period. Averages for the years 1921, 1925, and 1930 to 1936, appear in Table VIII.

Table VIII—Average Revenue per Ton-Mile and Passenger-Mile 1921-1936

Year	Revenue per ton-mile (cents)	Revenue per passenger-mile (cents)
1936	0.984	1.850
1935	0.988	1.935
1934	0.978	1.918
1933	0.999	2.013
1932	1.046	2.219
1931	1.051	2.513
1930	1.063	2.717
1925	1.097	2.938
1921	1.275	3.086

Capital Expenditures and Purchases

Table IX summarizes the amounts spent by railways of Class I for capital improvements, and for the purchase of material and supplies, for each of the ten years from 1927 to 1936. The entries for 1936 are estimates, subject to later correction.

Gross capital expenditures for 1936 aggregated $300,000,000, and purchases of material and supplies amounted to $750,000,000. The combined total of $1,050,000,000 represented one phase of the railway industry's increased contribution to the progress of recovery, already alluded to in some detail above.

Steam locomotive and freight car installations were greater in number in 1936 than in 1935, while installations of electric locomotives and passenger cars declined. The number of units of all classes of equipment on order at the close of the year, showed an increase over the last day of 1935.

According to the Car Service Division, Association of American Railroads, 77 steam and 32 electric or Diesel-electric locomotives, and 39,556 freight cars, were installed during the first 11 months of 1936. Freight car statistics include those of railroad-owned private refrigerator companies. As of December 1, 1936, 111 steam and 5 electric or Diesel-electric locomotives, and 19,844 freight cars, were on order. Table X shows statistics of equipment installations and units on order, each year from 1930 to 1936.

Table IX—Capital Expenditures and Purchases

Year	Capital expenditures	Purchases of materials and supplies
1936	$300,000,000	$750,000,000
1935	188,302,000	593,025,000
1934	212,712,000	600,224,000
1933	103,947,000	465,850,000
1932	167,194,000	445,000,000
1931	361,912,000	695,000,000
1930	872,608,000	1,038,500,000
1929	853,721,000	1,329,535,000
1928	676,665,000	1,271,341,000
1927	771,552,000	1,395,928,000
Total—ten years	$4,508,613,000	$8,584,403,000

Table X—Equipment Installations (Railroad Owned or Controlled Units)

	Installed during year	On order December 31
Steam locomotives:		
1936 (11 months)	77	111*
1935	40	5
1934	59	7
1933	1	1
1932	37	3
1931	124	39
1930	782	120
Electric locomotives:		
1936 (11 months)	32	5*
1935	102	3
1934	31	90
Freight cars:		
1936 (11 months)	39,556	19,844*
1935	8,903	12,805
1934	24,103	628
1933	1,879	224
1932	2,968	2,431
1931	12,662	4,042
1930	76,909	9,821
Passenger cars:		
1936 (9 months)	134	183†
1935	458	26
1934	406	182
1933	147	6
1932	205	15
1931	528	15
1930	1,702	264

* December 1.
† September 30.

The margin of locomotive and car supply over the demand declined both in 1935 and in 1936. Even so, no serious car shortages occurred during the year 1936.

The number of stored serviceable steam locomotives averaged 2,637 (11 months) in 1936, compared with 3,930 in 1935 and 5,042 in 1934.

The daily railway freight car surplus averaged 167,018 serviceable cars in 1936 (to November 30), compared with 283,431 in 1935 and 363,813 in 1934. These figures do not include privately owned or special service cars. The freight car surplus in 1936 ranged from a minimum of 112,369 to a maximum of 251,079 cars.

Steam locomotives in serviceable condition averaged 79.5 per cent in 1936, (11 months), 77.4 per cent in 1935, and 77.5 per cent in 1934. Serviceable freight cars

averaged 85.6 per cent in 1936 (11 months), 86.0 per cent in 1935, and 85.4 per cent in 1934.

Freight Train and Car Movement

Average speed of freight trains between terminals declined slightly in 1936, marking the first time since 1923 that improvement has not occurred over the previous year. Heavier traffic requirements would seem to explain the slight decline in 1936. This average, which is inclusive of all road delays, reached a new high record of 16.0 miles per hour in 1935, and attained the relatively high level of 15.9 miles in 1936. The increase from 1922 to 1936 was 43.2 per cent.

Table XI—Average Speed of Freight Trains

	(Miles per hour)
1936 (9 months)	15.9
1935	16.0
1934	15.9
1933	15.7
1932	15.5
1931	14.8
1930	13.8

The average speed of 15.9 miles per hour, if maintained for a continuous period of 24 hours, means a total distance of 382 miles covered by a freight train in the course of a day.

If average movement of freight cars and locomotives be reduced to an "active" basis, excluding surplus or stored and unserviceable equipment from the computations, a more nearly accurate picture of equipment performance is presented. On this basis, appreciable improvement occurred during 1936.

Average movement per "active" freight car per day during nine months of 1936, was 38.9 miles, compared with 36.2 miles for the corresponding period of 1935.

Average movement per "active" freight locomotive was 96.3 miles per day during 1936 (nine months), compared with 92.3 miles for the corresponding period of 1935. Similar averages for "active" passenger locomotives were 174.3 miles per day during 1936 (nine months), and 170.9 miles for the corresponding period of 1935.

Other Performance Averages

Generally speaking, the significant factors of operating efficiency showed improvement during the year 1936.

Both the average freight train load and the average car load increased in 1936. The average train load was 762 tons during the first nine months of 1936, compared with 728 tons during the corresponding period of 1935. Ton-miles per loaded freight car-mile for 1936 (nine months) averaged 26.6 tons, slightly higher than the corresponding average of 25.8 tons in 1935.

Net ton-miles per freight car per day showed an appreciable increase in 1936. The daily average was 497 ton-miles during the first nine months, compared with 405 ton-miles during the corresponding period of 1935.

Gross and net ton-miles per train-hour again broke all records in 1936. They were as follows, during the past four years.

Table XII—Gross and Net Ton-Miles per Train-Hour

	Gross	Net
1936 (9 months)	28,945	11,980
1935	28,768	11,718
1934	28,040	11,225
1933	27,344	10,974

Fuel consumption per 1,000 gross ton-miles in the freight service during the first nine months of 1936 was 119 pounds, the same average as that for 1935, and compared with 163 pounds in 1922. Fuel consumption per passenger train car-mile averaged 15.3 pounds during the first nine months of 1936, compared with 14.6 pounds during the same period of 1935, and 17.9 pounds in the year 1922.

Total number of casualties to nontrespassers resulting from train and nontrain operations increased during the first nine months of 1936, compared with the corresponding period of 1935. There was an increase of 144 fatalities, 5,197 non-fatal injuries, and an increase of 5,341 in total casualties. Passenger fatalities resulting from train and train service accidents declined from a total of 15 in the first nine months of 1935 to 12 in the same period of 1936.

Railway Employees

The railway personnel during 1936 averaged 1,065,000, compared with 994,371 employees in 1935, an increase of 7.1 per cent.

There was a gradual rise in railway employment during the year 1936, as indicated in the following table, which shows the count as of the middle of each month to November. The seasonal decline in November was less than that which occurs normally.

Table XIII—Number of Employees, by Months, 1936

Month	Number	Month	Number
January	981,853	July	1,085,928
February	1,032,413	August	1,090,485
March	1,021,014	September	1,101,643
April	1,049,723	October	1,109,448
May	1,068,415	November	1,092,080
June	1,077,555		

Conclusion

With progress toward recovery in 1936, the railways naturally look forward into 1937 with unusual interest. The possibilities are being analyzed, also, by all who recognize the close relationship between the general economic welfare and a strong railway position.

Will traffic and earnings continue to improve in 1937? Will traffic levels rise to a sufficient extent to at least offset the loss of revenue flowing from elimination of the emergency charges decreed by the Interstate Commerce Commission on December 31, 1936? Will prices continue to rise? Will Congress enact a six-hour day basis for the calculation of railway wages, and make the process of rail recovery by that much the more difficult? What will be the competitive situation?

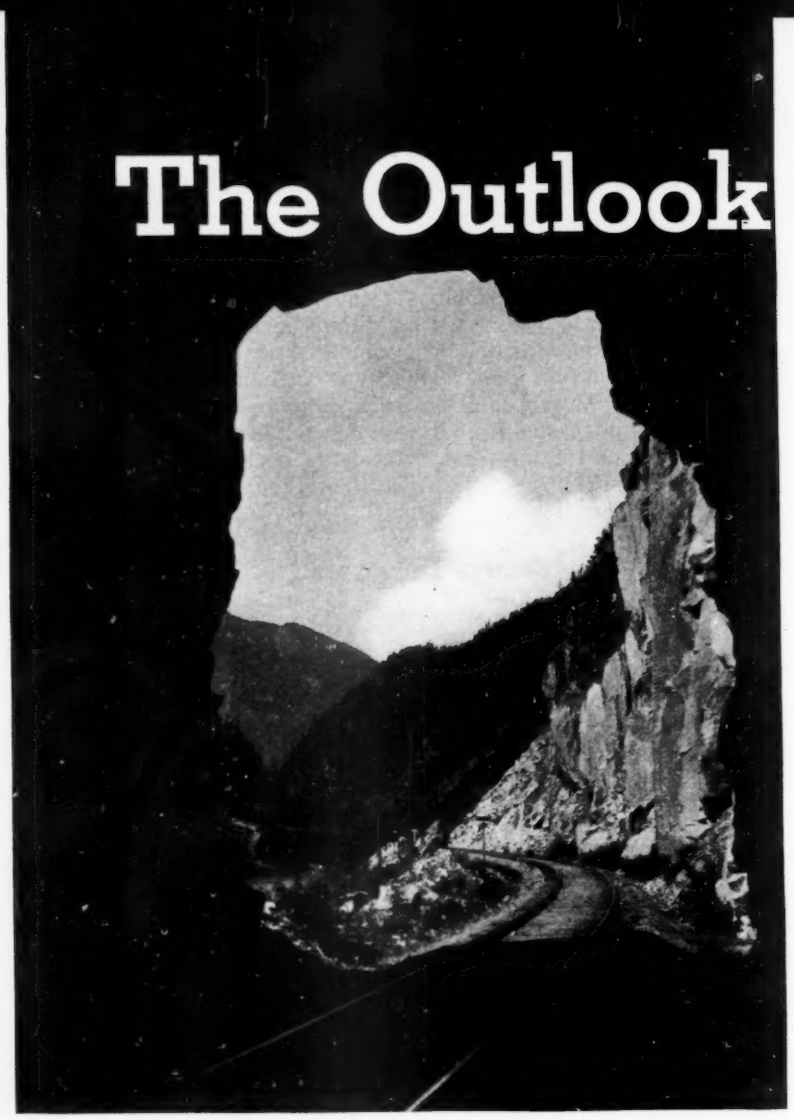
All these are significant questions, and the answer to every one of them lies in the range of speculative analysis. Some predictions may, however, be ventured, dangerous though any effort to chart future trends may be.

Predicated on a general continuance of world peace, railway traffic seems likely to show moderate increases in 1937. The favorable effect on revenues will be relatively less than on the traffic itself, because of the lower rate base that became effective on January 1. This will particularly embarrass those companies which in 1936 earned a net income only because of the emergency crease in revenue that rising traffic levels may produce.

Prices will continue to rise, and may offset any increase in revenue that rising traffic levels may produce. The price trend seems definitely upward.

The real unknown element in the 1937 equation is the character of legislation that may be considered by Congress. If new laws throw sudden and heavy burdens of costs on the railways, the measure of recovery already gained will be lost. The wisdom with which the several branches of government meet the problems of recovery in 1937 will largely determine the story of that year, so far as the railway industry is concerned.

The Outlook for 1937



Larger programs — greater expenditures for new trains, improved equipment and better track feature plans to improve service and prepare for heavier business

By Elmer T. Howson

Western Editor, Railway Age

THE railways will spend at least 20 per cent more for the improvement of their properties in 1937 than they expended in the year that has just closed. This conclusion is drawn from a survey of programs which the roads have formulated or have in course of preparation, supplemented by statements from the executives of most of the leading roads. It indicates the intention of the railway managements to continue at an accelerated pace the program of rehabilitation and of improvement which they launched during 1936.

Conditions are improving with the railways. This is evidenced by the marked increase in traffic during the last six months and by the large volume of purchases of cars, locomotives, rails and other materials made during the closing weeks of the year. It is evidenced also by the increasing number of roads that are again preparing programs for expenditures for the next year after several years of hand-to-mouth authorizations of individual expenditures from time to time as the need became urgent. As a result, we have again undertaken a survey of the budgetary outlook for railway expenditures after a lapse of five years.

A Long Established Practice

The preparation of budgets of proposed expenditures was long recognized by many roads as a practice contributing to the orderly development of the properties. Starting with the preparation of a statement of the needs by the local officers of each division, and the assembly of these various divisional budgets into a composite budget for the railway as a whole, a picture was presented which enabled executive officers to rate each need in the order of its importance or necessity and to establish a priority which, after approval by the board of directors, became a plan of action. By this means, it was the experience of those roads which followed the budgeting plan, that it was possible to keep before them at all times the relative importance of the various needs and to spend to the best advantage those funds that became available from time to time. Through the co-operation of the roads, we were given previews of their plans and these previews formed the basis for surveys of proposed expenditures that comprised an important feature of our annual statistical issues for 1923 to 1931, inclusive.

With the onset of the depression, conditions changed. Earnings declined so rapidly that orderly programs were no longer possible. Only those expenditures were undertaken that could not be postponed and they were authorized individually when they could no longer be delayed, without regard to any program. This was the situation which prevailed almost universally until recent months. It was the condition that brought about the suspension of this feature of our annual issue, for it reflected the absence of the programs that had previously formed the basis for these articles.

With the improvement that is taking place in railway earnings, however, the railways are returning to more normal practices—including the budgeting of their expenditures. On many roads, recovery has not yet progressed to the point that their managements are looking beyond the immediate necessities to a more orderly procedure; on others that are in receivership or trusteeship, action is dependent on approval of officers of the court.

However, of some 36 roads (with nearly 60 per cent of the mileage of the United States and Canada) which have advised us of the status and nature of their programs, 18 now have definite programs or budgets in hand, 7 more have partial programs before them, while 11 are as yet in the early stages of their studies of their needs or are not yet working to specific programs. These reports, while admittedly incomplete, are still sufficiently inclusive to indicate certain definite trends in expenditures during the next year.

Must Be Flexible

It is recognized in the preparation of budgets, even in more normal times, that all programs are subject to revision with marked changes in traffic and earnings. Yet, not a few managements feel that the outlook is not yet sufficiently stable to warrant even tentative planning, a viewpoint which was expressed by the executive of one prominent railroad in a statement that "In view of the indebtedness of this company to the Reconstruction Finance Corporation and to the banks, the uncertainty as to the continuation of the emergency charges, the added burden placed on debtor companies by the tax on undistributed income, and the possibility of adverse labor legislation in 1937, I do not feel that our company is warranted in taking on extensive new obligations as to improvements to fixed property or equipment until some of the doubts as to the future have been resolved."

This attitude of caution is tending to hold back programs on many roads, especially for major projects which, when once undertaken, must be carried to completion. Yet this attitude is by no means universal, as illustrated by the statement of the chief executive of another large road that "our section of the country has been going through a cycle of dry years, but we are anticipating a cycle of wet years and good crops, with a resulting upward swing in general business. With such an outlook, we feel the need for carrying out a more liberal maintenance and improvement program."

This difference in viewpoint is introducing an element of added flexibility in all budgets, illustrated by the statement of the chief executive officer of one of the largest railways that "I cannot vouch for the fact that we will do what is indicated in the attached statement, although it is conceivable that we may do a great deal more."

With all of the uncertainties that still exist, however, the fact remains that whereas a year ago few of the railways were considering expenditures on other than a hand-to-mouth basis, approximately half of those from whom we now have advice have definite programs in hand and not a few of them have already made public announcement of the major items in these programs. This change in practice reflects an increasing confidence in the future of the railways that is highly significant and encouraging.

Freight Cars Head List

With this evidence of growing optimism, the question arises at once as to the direction these expenditures will take. The answer is quite definite. It is reflected in the commitments that have already been announced. These commitments are as yet confined largely to four or five definite objectives, without the ramifications that are found when funds are more readily available for the wide variety of facilities that go to make up a modern railway.

Standing at the head of the list on many budgets is the replenishing of equipment. During the last six years, when the roads have been so completely out of the equipment markets, the number of cars and locomotives available for service has declined steadily as wear and tear and obsolescence have taken their toll. As a result, the number of freight cars now available for service on the Class I roads is over a half million less than ten years ago, while the decline since the beginning of the depression in 1929 approximates 438,000 cars, or more than 20 per cent. While the increased capacity of such cars as have been placed in service and the more efficient utilization of equipment have offset this shrinkage somewhat, it has been estimated that it will be necessary for the railways to buy a minimum of 150,000 new cars before next fall if they are to be able to handle the traffic that may normally be expected at that season.

That railway executives are aware of this situation and are taking steps to meet it is evidenced by the fact that since October 1, 1936, they have ordered more than 26,000 freight cars, while formal inquiries are still outstanding for 13,000 additional cars. The orders that have already been placed during the last three months of last year alone, and the inquiries that are still outstanding, deliveries on all of which will be completed during 1937, exceed the total number of cars built during any full year since 1930. Furthermore, since these orders are confined to a relatively small number of roads, it is to be expected that they are the forerunners of still other orders from roads that have not yet entered the market but whose needs are as great as those which have already placed orders. This supposition is borne out by data gathered from the budgets furnished us, which indicate that purchases of freight cars will be

Railway Programs Are Front Page News

materially amplified during 1937 over 1936 totals.

Closely akin to expenditures for the construction of new cars is the rebuilding of existing cars to adapt them to present-day service requirements. For this purpose, those roads whose budgets we have, plan to rebuild approximately three times as many cars as they are ordering new. If the practices of these roads are indicative of the roads as a whole, more than 160,000 freight cars will be rebuilt this year, at a total cost of more than $80,000,000.

Locomotives Also Near Top

A similar situation prevails with regard to locomotives. The number of locomotives in the service of the Class I railways reached a maximum of 65,358 in 1924. In the next five years the number declined 7,787 or 1,557 per year. In the years 1930 to 1935, inclusive, the number of units declined to 46,594, an average decrease of 1,830 units per year. In the years prior to 1930, the trend as regards tractive power was somewhat different because of the replacement of smaller locomotives with those of greater power. As a result, the maximum tractive power was attained in 1926 while the decline in total tractive power from 1924 to 1929, inclusive, was only 1.6 per cent. In the six years that followed, however, the total tractive power declined nearly 13 per cent to a figure less than in any year since 1917. Furthermore, as has been pointed out repeatedly in these columns, more than 60 per cent of the locomotives now in service are more than 20 years old and less than 12 per cent are less than 10 years old.

Because of these facts, it is significant that the railways have placed orders since October 1 last for 1937 delivery of 349 locomotives and are negotiating formally for 61 more. In other words, more locomotives are already on order for 1937 delivery than were ordered in 1932, 1933, 1934 and 1935 combined, and the outlook is for the output of the locomotive plants to exceed that for any year since 1930 when 972 units were delivered, largely on orders placed in 1929.

As with freight cars, the railways will spend large amounts this year for rebuilding locomotives they already own. The amounts that are allocated for this purpose are far larger than normal, one road contemplating the expenditure of $5,875,000, another $4,250,000, a third $2,242,000, etc. In all, some 16 roads plan to spend more than $17,250,000 for this purpose. If this ratio holds good, the railways of the United States and Canada will spend some $80,000,000 for the rebuilding of locomotives this year.

Passenger Equipment in Limelight

With the rather astonishing response of the public to the innovations that the railways have offered in passenger service during the last two or three years, it is natural to expect that these measures will be continued on an increasing scale and the budgets that have been completed confirm this view. So far as new trains are concerned, orders were announced in the closing weeks of last year for 10 trains of streamline design, 8 of Diesel and 2 with steam power, while an equal or even larger number of trains are in process of more or less informal negotiation, with the certainty that the number of trains of these newer designs will be materially increased during the year.

Likewise, the roads are giving more consideration to the purchase of new passenger equipment, both to provide the facilities necessary to care for the increasing business and to provide the new equipment that the public desires, typical of which is the recent order of the U. P.-S.P.-C. & N. W. for 28 coaches of the Challenger type. Evidence of the growing interest in passenger car purchases is afforded by the fact that 83 cars have been ordered since October 15, while definite inquiries have already been issued for 116 more. By way of contrast, only 56 cars were ordered in 1931, 1932 and 1933 combined, and only 63 in 1935, 55 of which were milk cars for one road.

Equally significant is the widespread interest in the rebuilding and modernization of existing passenger equipment. From the information in hand, it would appear that the roads of the United States and Canada will spend at least $30,000,000 this year for the improvement of some 2,500 passenger cars, primarily for air conditioning, but also including new seats, improved lavatories and illumination and those other accessories of modern passenger equipment.

Roadway Buying Also Large

But the railways are not confining their interest to equipment. Equal interest is being displayed in roadway improvements. In the past, expenditures for fixed facilities have been divided between those for (a) new lines, additional main tracks, classification yards, passenger stations and other major additions to the properties, normally planned and built by the engineering department, and (b) those for the repair, reconstruction and enlargement of existing facilities, commonly handled by the maintenance of way department, where such a department exists separate from the engineering department.

Since the onset of the depression, expenditures in the first category have been confined almost entirely to those necessary for the completion of projects already started, with the result that this work is now at the lowest ebb since such records have been kept. A study of the budgets indicates little change in this situation for the coming year, although some projects long held in abeyance are again being considered. With roadway capacity in excess of present needs, there is little incentive to provide additional facilities. Rather, such limited capital expenditures as are being made are primarily to (a) meet new conditions, such as the reconstruction of existing lines to reduce curvature to permit the operation of trains on the new and extremely fast schedules, or (b) to promote operating economies by replacing obsolete facilities, such as trestle-type coaling stations.

Large Appropriations for Maintenance

For the most part, expenditures for roadway are going to make good the deferred maintenance which has accumulated during the last six years of restricted expenditures for upkeep, and which has been variously estimated to aggregate up to one billion dollars. Indices of this retrenchment are estimated deficiencies in the renewal of more than three million tons of rail and one hundred million ties. Other expenditures for less vital and less readily measured purposes are deficient in equal or even greater degree down to building painting where the neglect has been almost complete.

Recognizing that this policy of undermaintenance cannot be maintained indefinitely and that roadway is an essential counterpart to equipment in this day of faster speeds, the railways are increasing their expenditures for roadway maintenance as well as for equipment. In 1936 the roads increased their outlay for maintenance of way 16 per cent. Figures in hand indicate that they will increase their expenditures for roadway and struc-

tures in 1937 over 1936 by at least a similar ratio.

One index of the degree of activity to be expected in roadway maintenance is afforded by the orders for rail. Orders for rails normally begin to be placed shortly after October 1 for delivery early in the following year, and the bulk of the year's orders are placed by March 1. This year the placing of orders was hastened somewhat by the raising of the price of rails on December 1. To date more than 850,000 tons have been ordered since October 1, with a number of roads yet to be heard from. It is safe to assume, therefore, that the tonnage of new rail purchased and laid this year will materially exceed 1,000,000 tons, the first year in which this mark has been passed since 1930. It compares with a minimum of 394,536 tons laid in 1932 and an average of 656,000 tons laid in the six years of 1931-36, inclusive.

"As rail goes, so goes roadway maintenance" is a fair criterion of other roadway expenditures. Additional allocations are being made for the upkeep and improvement of that wide variety of facilities that make up a railway property. They will go as yet largely for these facilities that contribute to faster and stronger track or to economy of performance, although as the most urgent of these needs are met, more money will go to other important but less pressing work such as painting. Of such work there is a vast accumulation since it has given way to the more pressing requirements of the track for six years. Work of this character will receive great impetus during the next year or two.

A feature of roadway work that is indicative of the change that is taking place in transportation practices is the money that is being spent to reduce the degree of curvature on those lines over which the new high-speed trains are being operated or proposed. Whereas curves of 3 and 4 deg. have heretofore been considered light, several roads are now spending large sums to reduce these to 1 deg. and 1 deg. 30 min. With the extension of these fast train schedules to other lines, more work of this character is in immediate prospect.

Many Miscellaneous Expenditures in Prospect

In addition to expenditures for such major objectives as cars, locomotives and rail, the budgets of the roads disclose plans for the purchase this year of increasing amounts of special equipment, such as machine tools for the mechanical department and tie tampers, rail laying cranes and other forms of work equipment for roadway and structures forces. Purchases of such equipment increased markedly last year; the budgets of the roads indicate still greater acceleration this year.

Still another type of expenditure that is receiving specific attention by reason of its adaptation to the newer phases of railway operation is signaling. Thoroughly established as an economical means of increasing the capacity of a line, signaling and its newer development, centralized traffic control, are coming to the top in not a few budgets as increasing traffic again threatens to congest certain lines. Equally or even more pressing, however, is the necessity for revising and modernizing the signaling on many of the lines where the newer high-speed trains are proposed.

In still another direction, signaling has received greatly increased recognition during the last two years—namely in highway crossing protection. With the public definitely committed to grade crossing protection as a public responsibilty and with the inclusion by the United States Bureau of Public Roads of crossing protection as a definite part, together with grade separation and highway relocation, in a nation-wide program for increasing highway safety, it is to be expected that the installation of signaling devices will be extended rapidly during the year since complete separation of grades is economically feasible at only a limited number of crossings. Already certain states have launched state-wide programs. It is to be expected that this practice will become universal.

As a result of the adaptability of signaling in its various forms to the newer problems of railway transportation, the budgets of the railways show even larger proportionate allocations of funds to these purposes in 1937 than existed in the days immediately prior to the depression.

Summary

In brief, the railways are rapidly returning to normal, one indication being their gradual return to the practice of budgeting their expenditures as an aid to the orderly development of their properties. The budgets that have been prepared for 1937 indicate an increase of 20 per cent in expenditures. These increases will go for equipment and roadway alike, although equipment will show a larger increase (more than 25 per cent) than roadway (10 to 15 per cent). But every branch of the railway supply industry will feel the impetus of these enlarged programs, some more directly than others, especially in those channels contributing directly to new high-speed passenger service.

* * * *

On the Northern Pacific at Butte, Mont.

The Canadian National and the Canadian Pacific Placed a Number of Streamlined Trains and Streamlined Locomotives in Service During the Year. Photograph Shows Streamlined Locomotive Hauling International Limited of the Canadian National

1936—A Year of Outstanding Traffic Developments

American railroads lead all others with streamlined trains, fast schedules, and air-conditioning

By Raymond A. Doster

Associate Editor

A RECORD-BREAKING inauguration of streamlined passenger trains, a further widespread speeding up of both passenger and freight train schedules, the air-conditioning of more passenger cars and a marked extension of pick-up and delivery service for merchandise were the major contributions of the railways to the improvement of passenger and freight service in 1936. By pressing these programs aggressively during the year, the railroads of the United States and Canada have not only maintained their superiority over the railroads of other countries, but have lengthened their lead to the point where they now offer the largest fleet of fast passenger and freight trains, more streamlined trains and more air-conditioned cars than the railroads of all other countries combined.

The most outstanding accomplishment of the American railroads last year was the installation of streamlined trains for passenger service. During the year 22 of these new trains were placed in service, 14 in the United States and 8 in Canada, while 10 more for the United States were ordered for delivery in the early part of 1937. Those placed in service include the Super Chief of the Atchison, Topeka & Santa Fe; the Streamliners—City of Los Angeles, City of San Francisco, and City of Denver (2 trains) of the Union Pacific-Chicago & North Western; the Green Diamond of the Illinois Central; the Mercury of the New York Central; the Besler train of the New York, New Haven & Hartford; the New Twin Cities Hiawatha (2 trains) of the Chicago, Milwaukee, St. Paul & Pacific; and the Denver (2 trains) and New Twin Cities Zephyrs (2 trains) of the Chicago, Burlington & Quincy. Those on order include the six Rockets of the Chicago, Rock Island & Pacific; the new City of Los Angeles and City of San Francisco of the Union Pacific-Chicago & North Western-Southern Pacific, and the Daylight (2 trains) of the Southern Pacific. In addition, 8 trains were placed in service by the Canadian Pacific and the Canadian National in Canada. With the 22 streamlined trains installed, the 10 ordered in 1936 for delivery this year, and the 14 that were in service prior to 1936, 11 United States and 2 Canadian railroads will soon have a total of 46 streamlined trains in regular operation. These are shown in the accompanying table.

That streamlined trains have created traffic and have attained high train-mile earnings is shown by their performance. Probably the most outstanding record in this respect is that of the Hiawatha which, on December 3, 1936, carried its 400,000th passenger and on December 19 increased its total to 412,962 passengers. Since May 29, 1935, when the train was placed in service, an aver-

age of 723 tickets have been lifted on all units each day. During the first year of operation the revenue of the train, not including that from dining cars, averaged $3.29 a train-mile, while during the four months from June to September, 1936, it averaged $3.98 per train-mile. Owing to increasing demands for accommodations on this train, its original consist of seven cars was increased to eight cars, and when the trains were re-equipped on October 11, the number was increased to nine. Even then it has been necessary to operate additional sections in the 17 months the train has been in service. On several days as many as four extra sections have been operated.

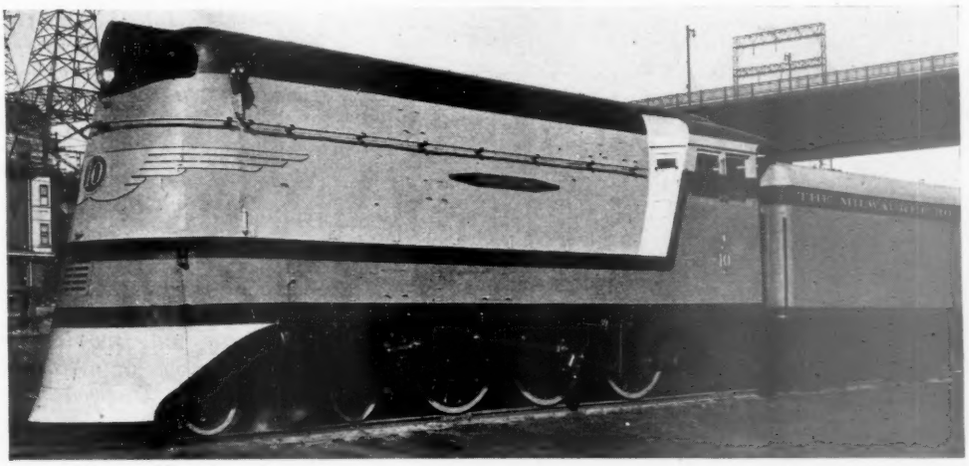
In the Chicago-Twin City service the three-car Zephyrs of the Chicago, Burlington & Quincy have also attracted capacity loads, with the result that from April 1, 1935, to October 31, 1936, a total of 180,136 revenue passengers were carried. To handle the traffic, these trains were replaced with seven-car trains on December 18. Each of these trains makes a round trip of 884 miles a day.

Likewise the Union Pacific—Chicago & North Western streamliners have produced gross revenues averaging close to $3 per train-mile. While the streamliner City of Denver carried more than 35,000 passengers from June 18 to November 30. Patronage on the Chicago & North Western's "400" between Chicago and Minneapolis has likewise shown a steady increase since its inauguration, present monthly revenues being about 48 per cent higher than a year ago. Further east

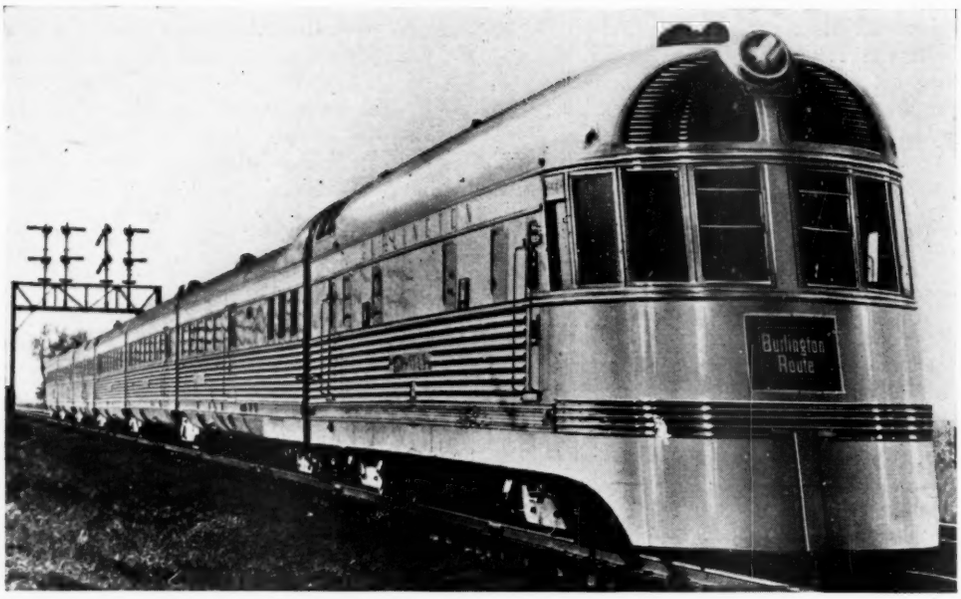
Streamlined or High-Speed Trains

Train	Railroad	Between	Placed in Scheduled Service	Type of Motive Power	Type of Equipment	Revenue Cars
Original Zephyr No. 9900	C. B. & Q.	Lincoln-Kansas City	11-11-34	D	LW	*3
"400" (Two trains)	C. & N. W.	Chicago-Twin Cities	1-2-35	S	ST	8
City of Salina	U. P.	Kansas City-Salina	1-31-35	D	LW	*3
Flying Yankee	B. & M.-Me. C.	Boston-Bangor	4-1-35	D	LW	*3
Twin Zephyrs (Two trains No. 9901 and 9902)	C. B. & Q.	Chicago-Twin Cities	4-21-35	D	LW	*3
Replaced by trains No. 9904 and 9905 (1 locomotive and 6 cars) on Dec. 18. Train No. 9901 rechristened Sam Houston on Dec. 1 and 1 car added and No. 9902 Ozark State Limited on Dec. 20 and 1 car added.						
Hiawatha (two trains)	C. M. ST. P. & P.	Chicago-Twin Cities	5-29-35	S	LW	8
(Re-equipped October 11, 1936, and old equipment assigned to other service)						
Comet	N. Y. N. H. & H.	Boston-Providence	6-5-35	D	LW	†3
City of Portland	U. P.-C. & N. W.	Chicago-Portland	6-6-35	D	LW	6
Royal Blue	B. & O.	Washington-Jersey City	6-24-35	S	LW	8
Abraham Lincoln	Alton	Chicago-St. Louis	7-1-35	D	LW	8
Rebel	G. M. & N.	New Orleans-Jackson	7-10-35	D	LW	*4
Mark Twain Zephyr No. 9903	C. B. & Q.	St. Louis-Burlington	10-28-35	D	LW	*4
		Installed in 1936				
Super Chief	A. T. & S. F.	Chicago-Los Angeles	5-12-36	D	ST	8
City of Los Angeles	U. P.-C. & N. W.	Chicago-Los Angeles	5-15-36	D	LW	9
Green Diamond	I. C.	Chicago-St. Louis	5-17-36	D	LW	4
City of San Francisco	U. P. S. P. C. & N. W.	Chicago-San Francisco	6-14-36	D	LW	9
City of Denver (2 trains)	U. P.-C. & N. W.	Chicago-Denver	6-18-36	D	LW	10
Mercury	N. Y. C.	Cleveland-Detroit	7-15-36	S	LW	9
Besler	N. Y. N. H. & H.	Bridgeport-Hartford	8-1-36	S	LW	*2
Twin Cities Hiawatha (2 trains)	C. M. ST. P. & P.	Chicago-Twin Cities	10-11-36	S	LW	9
One unit of old Hiawatha renamed North Woods Hiawatha, other unit became second section of Twin Cities Hiawatha						
Denver Zephyrs (No. 9906 & 9907)	C. B. & Q.	Chicago-Denver	11-7-36	D	LW	10
From May 31 to Nov. 7 trains No. 9900 and 9903 were operated as the Advance Denver Zephyrs.						
Twin Zephyrs (No. 9904 and 9905)	C. B. & Q.	Chicago-Twin Cities	12-18-36	D	LW	6
		To be installed in 1937				
Rocket	C. R. I. & P.	Chicago-Peoria	On Order	D	LW	*4
Rocket	C. R. I. & P.	Chicago-Des Moines	On Order	D	LW	*4
Rocket (2 trains)	C. R. I. & P.	Kansas City-Denver	On Order	D	LW	*3
Rocket (2 trains)	C. R. I. & P.	Kansas City-Twin Cities	On Order	D	LW	*3
City of Los Angeles	U. P. C. & N. W.	Chicago-Los Angeles	On Order	D	LW	14
City of San Francisco	U. P. S. P. C. & N. W.	Chicago-San Francisco	On Order	D	LW	14
Present trains will be used in overnight service between St. Louis, Mo., and Denver, Colo.						
Daylight (2 trains)	S. P.	Los Angeles-San Francisco	On Order	S	LW	12
		Installed in Canada in 1936				
International Ltd. (2 trains)	C. N.	Montreal-Sarnia	7-1-36	S	ST	12
Mapleleaf (2 trains)	C. N.	Montreal-Sarnia	7-1-36	S	ST	12
Royal York (1 train)	C. P.	Detroit-Toronto	9-27-36	S	LW	4
(2 trains)	C. P.	Montreal-Quebec	9-27-36	S	LW	4
Chinook (1 train)	C. P.	Calgary-Edmonton	9-27-36	S	LW	4

D—Diesel-electric
S—Steam
LW—Light weight
ST—Standard equipment.
*—One combination motive power and revenue car included.
†—One power plant in each end of train.



This Streamlined Locomotive of the North Woods Hiawatha Is One of a Fleet of Five Used by the Milwaukee



The Latest Streamlined Train To Be Placed in Service During the Year—One of the Burlington Twin Zephyrs

the traffic attracted to the Mercury of the New York Central has been so great that two more coaches are being constructed which will give the train a total of 9 cars. This train is earning about $3.50 a mile eastbound.

It is an illuminating commentary on the traffic-producing characteristics of these new trains that about 30 per cent of the passengers have been drawn from other forms of transportation. Conversely, one road found that when it withdrew two of its streamline trains from the runs to which they were originally assigned to meet the requirements of other lines, the traffic dropped back to its earlier volume, even though the steam trains which were substituted made practically the same schedules as the trains of newer design had done.

Other New Trains and Cars Added

In addition to streamlined trains several roads have placed in service trains of standard equipment with numerous innovations in fittings and in service. The most outstanding train of this character installed during the year was the Challenger of the Union Pacific—Chicago & North Western between Chicago and Los Angeles, Cal. This coach and tourist sleeping car train, the only one of its kind, was modernized at a cost of $600,000. Unique features of its service include special coaches for the exclusive use of women and children, a graduate registered nurse, porter service, blue lights in the coaches for night use, low-cost meals, etc.

Pullman's Latest Lightweight Steel Alloy Sleeping Car Can Be Occupied En Suite by Means of Sliding Partitions

A train, similar to the Challenger, for inauguration on January 3, 1937, between Chicago and Los Angeles was announced by the Chicago, Rock Island & Pacific and the Southern Pacific at the close of 1936. This train, the Californian, will consist of reclining chair cars and tourist sleeping cars and will also feature economy meals, free pillows, adjustable seats and lights that will be dimmed at night.

Among the cars of new design that were placed in service during the year, were a Pullman twin sleeping car unit and a truss frame sleeping car. The twin sleeping car unit is a light weight streamlined articulated two-unit car so constructed that it can be used in a train with car units of present standard type. Cor-Ten steel is used in the body construction and aluminum alloy in the interior finish. The first unit, Advance, is fitted with single rooms of the duplex type while the second, Progress, is partly devoted to room facilities, with a buffet-observation lounge at the rear. The truss frame sleeping car, Forward, is unique in that this type of construction is unlike any previously used in modern streamline railroad equipment. Its new type of truss side-frame construction in conjunction with the use of high-tensile alloy steel structural materials make the car about 40 per cent lighter in weight than a conventional Pullman car of the same capacity. The car contains eight sections, two double bedrooms and two compartments. Its main features are windows in the upper berths, folding steps, indirect overhead lights and blue night lights. Among the new cars placed in service by the railroads was an Atchison, Topeka & Santa Fe light weight alloy coach.

Increased Speeds Outstanding

Another outstanding development during the year was a further widespread speeding up of passenger train schedules, with the result that the United States now has not only the fastest scheduled trains for distances of 400 miles or more but has a greater number of trains scheduled at speeds of more than 60 miles per hour than any other country in the world. In addition it has more trains whose daily schedules require operating

Coffee-Shop Dining Car on Union Pacific "Challenger"

speeds of 80 m.p.h. or more and of these, world records are held by two trains which regularly reach scheduled speeds of 108 miles per hour on their daily runs and two more which average 106 miles per hour for one mile on each daily trip. Several trains in daily service are capable of speeds of 100 miles per hour.

It is through the inauguration of schedules such as these that 11 hr. 55 min. was taken from the schedules between Chicago and Denver and 14 hours eliminated between Chicago and the Pacific Coast during the year. With the 15 hr. 50 min. schedules eastbound from Denver to Chicago, the Streamliner City of Denver of the U.P.-C.&N.W. averages 66.2 miles per hour for the 1,048 miles, while the average speed of the Denver Zephyr between the same points is 65.3 miles per hour for the 1,034 miles. Likewise, on the 39¾ hr. schedule between Chicago and Los Angeles, the City of Los Angeles of the U.P.-C.&N.W. averages 57.8 miles per hour for the 2,298 miles while the Super Chief of the A.T. & S.F. averages 56 miles per hour for its 2,228 miles. The streamliner City of San Francisco averages 56.8 miles per hour for the 2,260 miles between Chicago and San Francisco.

Similar but less striking reductions in time were also made between many other cities. When the Illinois Central placed its Green Diamond in service between Chicago and St. Louis on May 17, on a schedule of 4 hr. 55 min., and the Alton speeded up its Abraham Lincoln to the same schedule, the travel time between these cities was reduced 1½ hours below that which existed as recently as two years ago. When the Chicago, Burlington & Quincy placed its Ozark State Limited on a 5½ hr. schedule and thus reduced the travel time between St. Louis, Mo. and Kansas City one half hour, the Missouri Pacific and the Wabash placed their 6-hr. trains on the same schedule. Between Los Angeles, Cal. and San Francisco the time was reduced 1¾ hr., when the Southern Pacific placed its Daylight on a schedule of 11 hr. Between Chicago and Detroit another cut, following that of June, 1935, reduced the time of the Twilight Limited of the Michigan Central and the Detroit Arrow of the Pennsylvania-Wabash to 4¾ hr. for the 283.4 miles. Between Chicago and Toronto, Ont., 1¼ hr. was saved when the Grand Trunk-Canadian National speeded up its Mapleleaf and the Canadian Pacific its Overseas. Between New York and Washington both the Pennsylvania and the Baltimore & Ohio progressively speeded up numerous trains, culminating in a schedule of 3¾ hr. on September 29, 1935.

Lower Fares in East

Another development of outstanding importance during the year was the reduction in passenger fares on the Eastern roads on June 1 in compliance with an order of the Interstate Commerce Commission. The order made effective fares of 2 cents a mile in coaches and 3 cents a mile in Pullmans. This action brought to a head a difference in attitude that had existed for several years. Basic fare reductions had been discussed in all territories as early as 1930 but it was not until April 1, 1933, that the Louisville & Nashville placed a 2 cent rate in effect for six months, with the result that

Pickup and Delivery Service Was Initiated on the Eastern Railways Late in 1936

other lines in the South and Southeast offered similar reductions. On December 1, 1933, western lines reduced their basic rate to two cents a mile or lower. It was not until June 1, 1936, that the Eastern lines reduced their fares and then only on the order of the Interstate Commerce Commission, following which 23 of these lines, including all of the principal ones except the B. & O., appealed to the United States District Court for an injunction to restrain the commission from enforcing its order. Yet not only has the number of passengers handled increased markedly with the introduction of the lower fares but the revenues have risen also, the total of 11,007,850 passengers handled in May, 1936, increasing to 14,092,844 in September, 1936, and the revenues from $14,458,130 in May, 1936, to $18,022,266 in September, 1936.

Air Conditioning

Still another improvement in passenger service that was extended during the year was the air-conditioning of passenger train equipment, with the result that more than 8,000 air-conditioned cars were in service at the end of the year. This compares with 648 at the end of 1933, 2,526 at the end of 1934, and 5,874 at the end of 1935. Of these, more than 3,900 were railroad-owned and 4,100 were Pullman-owned. The total investment in the air conditioning equipment installed on these cars now exceeds $45,000,000.

Pickup and Delivery Service Established in East

In freight service the development of major importance was the extension of pickup and delivery in the East and the speeding up of freight trains, particularly merchandise trains to afford overnight service. Pickup and delivery service was made substantially universal in application in official classification territory by the eastern lines on November 16. The effective date was to have been April 1, but upon petition of American Trucking Associations, Inc., the I.C.C. on March 31, suspended the tariffs for 7 months pending investigation. Present tariffs provide for collection and delivery service without extra charge on less than carload freight in Eastern territory. When the service at point of origin or destination is performed by the shipper or consignee an allowance of 5 cents per 100 lb. is made.

With this action by eastern lines, pickup and delivery service is practically national in scope. Starting with a few lines in the Southwest in 1931 the service was extended by the western lines on December 13, 1935, and this year by the eastern railroads so that now it is available in every state.

Indicative of the speeding up of merchandise services during the year, is the inauguration by the Illinois Central of service from Chicago, affording first morning delivery at Memphis, Tenn., second morning delivery at New Orleans, La., and third morning delivery at Texas points. Under this service, which is one day faster than previously, trains leave Chicago at 7:45 p. m. and arrive at Memphis, 527 miles distant, at 8:35 a. m. the next morning and New Orelans at 4 a. m. the second morning. Similarly, the St. Louis-San Francisco established a merchandise freight train known as the Frisco Flash, on a schedule of 13 hr. for the 425 miles between St. Louis and Tulsa, Okla. New fast overnight merchandise trains between Chicago and Louisville, Ky., were placed in service by the Pennsylvania and the Chicago, Indianapolis & Louisville, the Monon's schedule being 9½ hr. for the 302 miles from Hammond, Ind. to Louisville.

Summary

The inauguration of streamlined trains, the reduction of travelling time between cities and the air conditioning of cars are indicative of the determination of the railroads to keep their passenger service superior to other forms of transportation. The developments in freight service likewise reflect their purpose to meet the competition of other transport agencies, and of trucks in particular, in the handling of goods.

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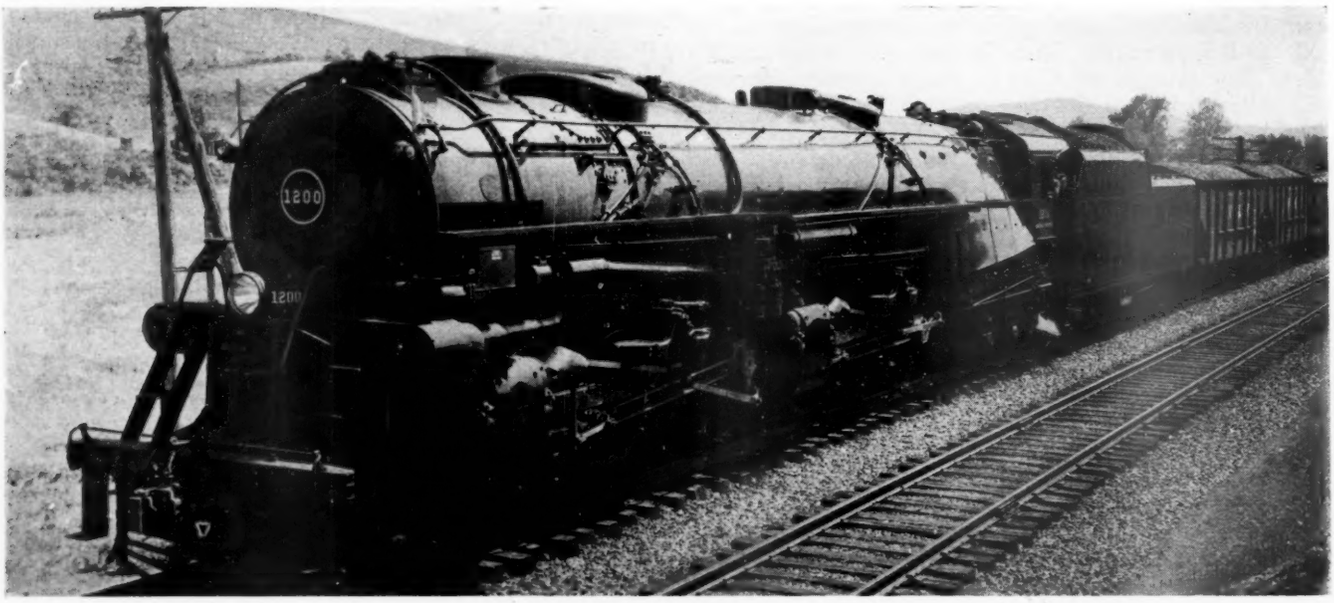


Norfolk & Western 2-6-6-4 Type Locomotive Which Develops 104,500 Lb. Tractive Force and a Maximum Drawbar Horsepower of 6,300 Lb. —Built in Company Shops

The Second Year of the A. A. R.

Departments and divisions of the railroad association have busy year in 1936

By H. F. Lane

Washington Editor

THE Association of American Railroads, organized in November, 1934, as a consolidation of the old American Railway Association, the Association of Railway Executives and other railroad associations and organizations, is now beginning its third year. While its activities have been somewhat less spectacular than some people were led to expect by some of the statements made at the time of its organization, the work of its numerous divisions, sections, bureaus, and committees has shown progress in the study of hundreds of subjects intended to bring about improvements in the economy and efficiency of railroad operation and in the service of the public, as well as to bring about more harmonious relations between the railroads.

Full Powers Not Exercised

The association has not yet found occasion to exercise its full powers, according to the article in its plan of organization under which the members agreed that, in any controversy over which the board of directors has assumed jurisdiction and has decided by the affirmative vote of three-fourths or more of its members, they will accept and carry out such decision or institute arbitration proceedings, but it is understood that there have been several important occasions in which officers of the association have been requested to arbitrate disputes.

The membership of the association at the time of its annual meeting included 138 Class I railroads, representing 99.2 per cent of the total Class I mileage and 99 per cent of the total Class I revenue, and a total of 231 railroads in all, including the smaller roads and the Mexican and Canadian roads, a total of 289,881 miles.

The directors held 13 meetings during the year, 4 in Chicago, and 9 in Washington, and the executive committee held 8 meetings in Washington.

Pursuant to a resolution adopted by the board at its meeting in November, 1935, the president has invited to each meeting of the board the chief executive officers of three member roads, not members of the board, so that in time the chief executive officer of every member road will have attended a meeting or meetings of the board to hear and participate in the discussion without the right to vote.

Progress has been made during the year on several projects considered at the annual meeting in Chicago in November, 1935, and referred to the regional organizations for action, although the subsequent action is attributed to the railroads themselves rather than to association action.

One of these was a recommendation that a plan of collection and delivery of merchandise freight be put into effect as soon as possible under such rate structures and to such extent as the several territories might work out. Some of the eastern roads already had such a plan in effect and early in the year tariffs providing for the introduction of such a plan in the West and South were filed with the Interstate Commerce Commission and allowed to become effective. Later, however, when the eastern roads filed tariffs providing for the general adoption of the collection and delivery plan, with some changes from that which had been in effect on the Pennsylvania and other roads, the tariffs were suspended by the commission as the result of vigorous protests made by the American Trucking Associations, Inc., and other trucking organizations, pending an investigation. On October 30 the commission gave out its decision dated October 13, finding the tariffs justified except in so far as a minimum rate of less than 45 cents per 100 pounds was applied. The trucking organizations applied to the courts for injunctions both in Washington and New York, but the courts declined to interfere and the plan became effective on November 16.

Under the threat of drastic regulation proposed in the Wheeler-Crosser bill committees representing the railroads and the Railway Labor Executives' Association on May 21 signed a five-year agreement providing for a system of allowances for the compensation of employees displaced or placed in lower positions by reason of co-ordination or consolidation projects.

Co-Ordination Projects

After the co-ordinator law expired on June 17 the board of directors of the association adopted a resolution requesting committees representing the Eastern, Western, and Southern regions to continue the studies of economies to be effected through co-ordination of facilities which had been begun prior to the appointment of Mr. Eastman as co-ordinator in 1933 and which were continued by Mr. Eastman through the regional co-ordination committees. The committees were to take up the study under present conditions of the projects theretofore considered by the three regional committees, "and such other projects as might from time to time be presented whereby economies in operation may be effected by co-ordination of services or facilities."

After the annual meeting on November 6 it was announced that 48 such studies had been completed, of which 10 were being put into effect and in addition, 673 were being re-examined in the light of changed labor and traffic conditions. Many of these, it was pointed out, involve elaborate engineering surveys as well as comprehensive and detailed studies of traffic conditions, operating costs, and other subjects which must be carefully considered before any conclusion can be reached as to their practicability.

Of the 48 projects on which studies have been completed, it was found in eight cases that a portion of the facilities proposed to be consolidated have since been abandoned with economies greater than were contemplated by co-ordination. Twenty-seven projects were

found to be impracticable either because no economy would result from co-ordination under present conditions, or the savings would be too small to warrant action. In several instances it was found that, since the projects were listed originally for study, the increase in railroad business has made co-ordination of facilities unwarranted. On three projects, final action was deferred.

There was also a recommendation last year that the various rate organizations proceed to such a revision of the rate structure on merchandise freight as will best meet competition and an important change in the l.c.l rate structure has since been proposed by the railroads to the I.C.C. after studies by committees, as part of their plan for a rate readjustment intended to take the place of the emergency freight surcharges, authorized by the commission in Ex Parte No. 115, on which hearings are to be held by the commission beginning on January 6. It is proposed, with few exceptions, to make the classification ratings on articles in less than carloads or any quantity rated not less than third class uniform on the basis of the lowest rating in any one of the classifications. It is stated that this will result in more than 1,800 reductions in rating and less than 40 increases. It will also contribute importantly to tariff simplification.

Responsive to a suggestion made by representatives of the automotive industry, the Joint Committee of Railroads and Highway Users has been re-established. A meeting of the committee was held in New York on September 17 at which it was agreed that letters would be circulated attaching copy of the recommendations agreed upon in 1933 with statements that the committee consider them still in effect but that conferences would be held to see if it is possible to redraft a joint agreement with such modifications and additions as may become necessary.

Law Department

The Law Department of the association has found 1936 to be a very busy year and looks forward to a similarly busy year in 1937. In addition to representing the railroads, or arranging for their representation, at the numerous hearings before Congressional committees on bills that would have vitally affected the railroads, and in several important proceedings before the Interstate Commerce Commission, the department has taken an active part in the litigation of the railroad retirement act and the railroad pension tax act which became law on August 29, 1935, with the assistance of a trial committee. On January 7 a bill of complaint was filed in the district court of the District of Columbia, challenging the validity of these acts. On June 26 Justice Bailey rendered an opinion holding the tax act unconstitutional and enjoined the collection of the tax from the railroads, although he did not make a similar finding as to the retirement act. The decree has been appealed by the government to the court of appeals of the District of Columbia and it is expected that the railroads will apply to the Supreme Court for a writ of certiorari in order that the case may be expedited.

The general counsel of the association has acted as chairman of a committee of counsel which by proceedings before the Interstate Commerce Commission has sought to find a way to preserve for the railroads at least a part of the revenue they have been collecting from the emergency surcharges.

With the assistance of an appropriate committee of lawyers and accountants the Law Department has made elaborate preparations for the presentation to the Senate committee on interstate commerce which is conducting an investigation of railroad finance of a comprehensive review of railroad operation and finances.

On some days when Congress was in session last spring it was necessary for counsel to appear at as many as five hearings in one day.

In view of the introduction in Congress of a bill providing for government ownership of railroads, although it has not yet been pressed, the association has employed Prof. Sidney L. Miller, professor of transportation at the University of Iowa, to make a study for the association, dealing with the financial, economic, and political aspects of the question.

At this session of Congress the railroads hope for the passage of the Pettengill bill for the repeal of the long-and-short-haul clause and the bill for the regulation of water carriers. They also expect to be called on to oppose with all their power a six-hour day bill and similar bills advocated by the railroad labor organizations.

An important accomplishment of the Law Department has been the organization of state railroad associations which have represented the railroads in legislative matters in the state legislatures and in Congress.

At a recent meeting the board of directors approved a plan for the consolidation with the Law Department of the Eastern Railroad Association and the Western Railroad Association which have represented the railroads in patent matters.

Operations and Maintenance Department

The work of the Operations and Maintenance Department is carried on through divisions and sections, each with many committees, special committees, and bureaus, most of which were formerly parts of the organization of the old American Railway Association. These include Division I—Operation; Division II—Transportation; the Car Service Division; Division IV—Engineering; Division V—Mechanical; Division VI—Purchases and Stores; Division VII—Freight Claims; and Division VIII—Motor Transport.

The Committee on Grade Crossing Elimination has cooperated closely with the Bureau of Public Roads in connection with the $200,000,000 grade crossing program and participated in hearings before congressional committee which led to the enactment of the bill authorizing appropriations of $50,000,000 a year for similar purposes in the fiscal years 1938 and 1939.

No meeting of the member roads of the Operating Division was held during the year, the General Committee handling matters by correspondence.

A general revision of the Standard Code of Train Rules, Block Signal Rules and Interlocking Rules has not been started as proposed, because it was not deemed absolutely necessary but consideration has been given to a number of specific changes.

The first annual session of the Transportation Division since 1930 was held at Chicago on May 21 and 22. A special committee has been engaged on a study requested by the board of directors to ascertain whether economy would result from the creation of a company similar to the Railway Express Agency to own and operate all refrigerator cars.

A committee has been engaged in the study of the cost of ownership of the various types of private line equipment for the purpose of determining the adequacy of mileage rates.

Progress has been made in the work of recodification of the Demurrage and Storage Rules for the purpose of simplification and clarification and on a plan for providing better supervision of the rules which has been studied in connection with a report on the subject made by representatives of Co-ordinator Eastman.

Because of progressively increasing freight car loadings since early spring, without corresponding increase

in serviceable cars available, car supply has been rather closely matched by car requirements, particularly since June, and in recent weeks some scattering shortages of small amounts have been reported. The Car Service Division has kept constantly in touch with this situation and recommendations were made to the railroads that each survey its supply and requirements for cars, particularly Class A box cars, cars of large cubical dimensions, and mill type gondolas, taking into account the trend of loading paralleling that of previous peak years of good business, with a view of providing the number of cars that might be necessary to insure an adequate supply. The considerable number of orders for new cars placed recently indicates that the recommendations have been heeded.

Detailed statistics are now available covering an entire year of operations under the average per diem plan for settlement of car hire between railroads. This plan contemplates that each railroad shall pay to each owner for the use of its box cars an amount representing the average detention of such cars on its line during the corresponding months of the years 1932, 1933, and 1934. This permits the holding of box cars for a suitable load, in accordance with the Car Service Rules, without increasing the per diem expense. It was primarily designed to eliminate such of the empty box car mileage as in the past has been caused by the so-called "per diem urge," particularly the empty mileage made in the direction of predominating loaded movement. There was a precipitate reduction in the percentage of empty car mileage after the adoption of the plan and figures published by the Car Service Division in its annual report show that the reduction has been maintained. For the year ended June 30, 1936, it was calculated that a saving of approximately 198,000,000 empty box car miles in the direction of predominating loaded movement had been made and, based on a calculation translating savings in empty mileage to savings in gross ton-mileage and of actual cost to railroads per 1,000 gross ton-miles, it was further estimated that the average per diem plan is saving the carriers of the country in excess of $12,000,000 per year.

The Engineering Division, in collaboration with a rail manufacturers' committee, has continued its rail researches, conducted at the Engineering Experiment Station of the University of Illinois, which have already produced constructive and valuable information. This work including research as to details of mill practice and manufacture as they affect rail quality and rail failures with special attention to transverse fissure failures, is now in its sixth year and has been extended for two more years, to January 1, 1939. Other tests and studies are being made of the economic value of different sizes of rail, rail lengths in excess of 39 feet, continuous welding of rail, various types of joint bars, etc.

The Mechanical Division, through its committees on car and locomotive construction, has also continued its studies of possible improvements in car and locomotive construction, in co-operation with the manufacturers, and extensive studies are being made as to the adaptability of many of the new steel alloys to both cars and locomotives. The Committee on Car Construction in its report for 1936 included designs of cast-steel alternate constructions for standard 50 and 70-ton hopper cars and this year it reported progress in connection with designs for standard refrigerator cars. Approximately 3,700 steel-sheathed wood-lined refrigerator cars are being built substantially in accord with the tentative agreements reached by the committee in regard to such design. The light-weight freight car designed and built by the Pullman-Standard Car Manufacturing Company has been subjected to additional tests. The light-weight box car designed substantially along the lines of the A. A. R. standard steel-sheathed wood-lined box car, except for the use of high-tensile materials, built by the Mt. Vernon Car Manufacturing Company, is also being subjected to impact tests. Other tests are being made in the matter of fusion welding of tank cars, trucks, brakes, draft gear, etc.

The Purchases and Stores Division is making studies as to further standardization of materials and supplies and in the methods of storing them in order to reduce inventories. The Special Purchasing Committee has continued important activities with matters concerning relations with industries, questions of coal prices, specifications, steel prices, etc., under the direction of the vice-president in charge of the Operations and Maintenance Department.

The Freight Container Bureau has been very active during the past year in developing improvements in packing and crating various fruits and vegetables as well as manufactured products to minimize losses in transit.

Traffic Department

When the new association was organized and its Traffic Department created, the associated railroads obtained for the first time a central traffic organization, a new combined activity for the railroads which represented in no sense a consolidation or broadening of previously functioning organizations. It has not been the policy to take over the functions of the existing territorial traffic associations and rate committees, although in several instances the department has injected itself into matters before them where it appeared that practices detrimental to the railroad industry as a whole could be prevented.

The Traffic Advisory Committee is the medium through which the principal subjects considered by the department are initiated and developed as well as through which they are progressed in the Traffic Executive Associations of the three districts. This committee is composed of 19 chief traffic officers, who are elected by the Traffic Executive Associations of the Eastern, Southern and Western districts from their membership, and, in addition, there are the three territorial chairmen of these associations and the vice-president in charge of traffic of the Railway Express Agency.

Among the subjects considered by this committee during the year in ways which are believed to have resulted in great benefit to the industry as a whole are the following:

Developments from the motor carrier act.

Consideration of the co-ordinator's merchandise report.

Authorization of a sub-committee on tariff simplification.

Appointment of a special committee of chief traffic officers in the three territories whose duty it is to see that interterritorial division controversies shall not be allowed to drag and that where differences arise they shall be promptly referred to the committees.

Appointment of a special divisions committee of traffic and accounting officers for the purpose of endeavoring to bring about a better situation with respect to agreement on divisions of revenue in the settlement of interline accounts.

Appointment of a sub-committee on weighing.

Approval by the Traffic Advisory Committee of a recommendation of the Tariff Simplification Committee for a unification of classification ratings on merchandise freight of third class or higher.

It is believed that the frequent meetings of the Traffic

Advisory Committee have resulted in a better understanding by the representatives of the situations with which other territories are confronted and have assured a better and more intelligent handling of interterritorial problems than would otherwise be possible.

The Traffic Department has also performed important services in connection with the presentation of the railroads' case, in co-operation with the Law Department, at hearings before Congressional committees on the long-and-short-haul bill, the Wheeler-Rayburn routing bill and the bill for the regulation of water carriers, as well as in the proceedings before the Interstate Commerce Commission in connection with the efforts of the railroads to obtain a continuation of the emergency surcharges or a substitute therefor.

The question of divisions of joint freight rates as between carriers and the efforts to recover merchandise traffic from the trucks through the dual method of reducing merchandise rates and the establishment of "all-commodity" carload rates are among the important questions confronting the traffic departments of the carriers that are being studied by the association's Traffic Department.

From time to time there have been cases of protest from one or more lines of the action of other lines or by one territory of the action of another territory and where such situations have arisen action has been delayed until such time as conferences might be had and an effort made to compose the difficulties. In certain instances the Traffic Department has been requested to arbitrate disputes and its awards have been accepted and put in operation without further difficulty.

Tariff Simplification

On December 10, 1935, the Traffic Advisory Committee created a National Tariff Simplification Committee, to be composed of the principal tariff publishing agents with J. G. Kerr, assistant to the vice-president-traffic, as chairman. The Interstate Commerce Commission designated George M. Crosland, assistant director of its Bureau of Traffic, to meet with the committee as an observer, to participate in the discussions and keep the commission informed as to progress made. Its organization now consists of nine tariff publishing agents, one I. C. C. representative, with a chairman and secretary.

The committee was charged with the duty of thoroughly analyzing the present freight tariffs in order to determine the causes for the widespread criticism of such tariffs from shippers and railroads alike, and to find ways and means of correcting such difficulties. It was given leeway to proceed in the manner which experience dictated would produce the best results, and directed to make progress reports to the Traffic Advisory Committee. It has made seven reports to the latter committee.

Since its first meeting the committee has held meetings each month, when possible, at the headquarters of the various publishing agents. Much of the work of the committee has been carried on by the members outside of these meetings.

The committee has solicited constructive suggestions and criticisms from Shippers Advisory Boards, National Industrial Traffic League, individual shippers and shippers' organizations, railroad traffic and accounting officers, station agents, rate clerks, etc., resulting in thousands of criticisms, suggestions for improvements, changes, etc. Each suggestion or criticism has been placed on the committee's docket for individual consideration on its merits.

Some of the more important subjects handled by the committee have been: unification of classification ratings; grouping of commodities under generic headings; unification of commodity descriptions; general rules and regulations; application of border rates as minima; application of combinations as maxima; diversion and reconsignment tariffs; geographical lists; cancellation of obsolete rates; supplemental matter, and tariff construction.

Research

One of the departments proposed in the original plan of organization, the Planning and Research Department, has not yet been completed and has no vice-president at its head, but a Research Advisory Board was created in February and there have been organized the Division of Competitive Transportation Research and the Division of Equipment Research. The Division of Competitive Transportation Research has maintained for its chief purpose the collection and analysis of pertinent current data which has been made available for such use by state legislative committees as they might find desirable. The central office in Washington has been compelled to devote a great deal of time to analysis of comprehensive reports prepared by the former co-ordinator's research staff on government aid and subsidies to railroads, waterways, and highways and on comparative hours, wages and working conditions.

The director of the western region has conducted a study to determine in a comprehensive way the character of traffic that has been diverted from railroads, together with the amount of revenue lost thereby. This analysis led to the study of two important groups of commodities, livestock and petroleum.

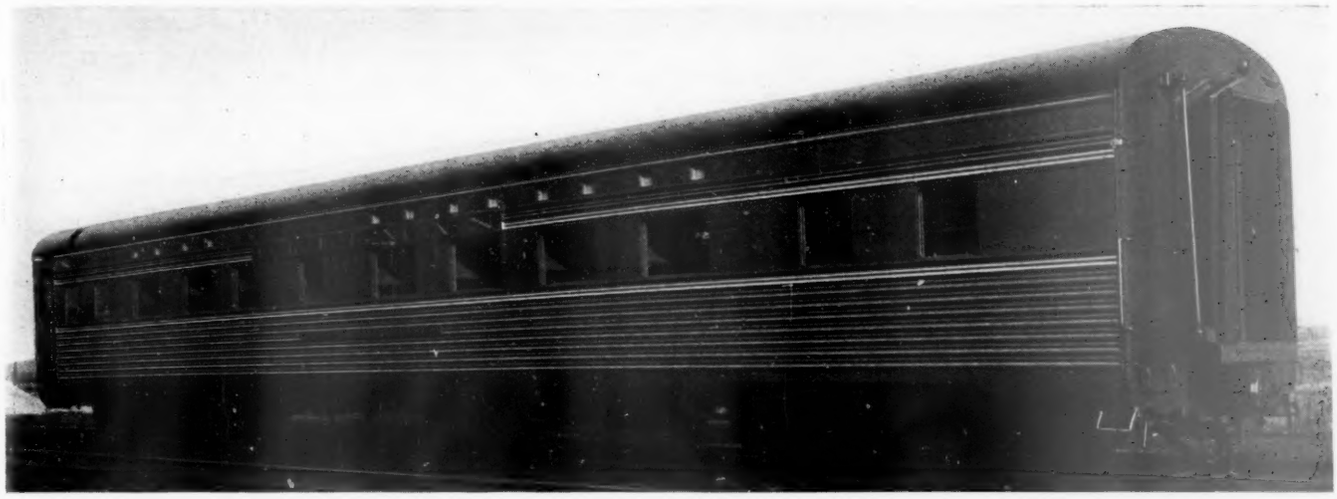
The major project of the year of the Division of Equipment Research has been the research program relating to the air-conditioning of railroad passenger cars, on which a comprehensive report has been submitted to the board of directors. The division has acted as the technical staff of the Car Construction Committee in extensive impact tests of the Pullman experimental light-weight box car and is conducting for the committee impact tests on the experimental light-weight box car of the Mt. Vernon Car Manufacturing Company.

Other subjects in which work has been completed include: proposed turbine locomotive, automobile loading devices, track lubricators, revision of Cole ratios, boiler plate, axles, crank pins, friction and anti-friction bearings, and car wheel contours.

Finance, Accounting, Taxation, and Valuation Department

During the past year the Accounting, Treasury, and Valuation divisions completed their organizations under the supervision of this department, making possible a better and closer co-ordination with the several departments of the association and increasing the effectiveness of their former functions. Much of the effort of the department during the year has been devoted to research and investigation of accounting methods and practices, in an endeavor to simplify and improve current methods, reduce the out-of-pocket cost of accounting, and at the same time to produce the information necessary for managerial or regulatory purposes. In conjunction with other departments of the association much time and study was given to various reports prepared under the direction of the federal co-ordinator of transportation and the preparation of comments as to their accounting features. Among other subjects some progress has been

(*Continued on page 31*)



The Pullman Car "Forward," of Alloy-Steel Truss-Frame Construction with Stainless-Steel Sheathing—Weight, 110,700 Lb.

Reserves of Equipment Approach Vanishing Point

Scattering freight-car shortages reported during October—Increased travel overtaxing passenger rolling stock

By C. B. Peck

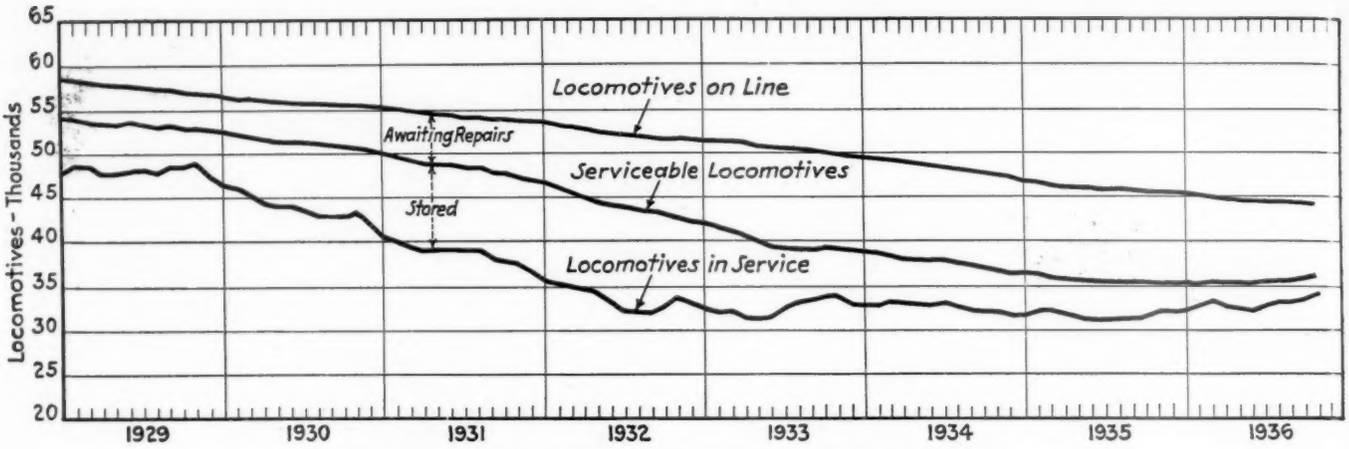
Mechanical Department Editor

NINETEEN Thirty Six was the first year in a long series of years in which all optimistic predictions as to the probable course of the railway equipment market have not been belied by the event. The estimates made a year ago by some of the financial houses interested in the securities of equipment and specialty manufacturers are being proved conservative by the past year's trend in traffic growth. These estimates generally passed over 1936 and indicated the ultimate crossing of the lines of equipment supply and demand some time during 1937. Present indications are that the remaining reserves of freight cars and locomotives are too low for safety and that a passenger-car reserve is already non-existent, particularly on the eastern railroads.

Surplus freight cars were reduced to 112,000 to 115,000 during October and November, with the appearance of scattering shortages in the supply of all classes of cars after the surplus dropped below 138,000 cars. During October and November a reduction of some 30,000 cars was made in the number out of service for repairs, and the only remaining reserve is approximately 100,000 cars still out of service for repairs in excess of the number which may be expected to remain when maintenance is fully restored to a current basis.

From the beginning of 1931 total freight cars on line have declined almost continuously month after month with few checks of short duration and no reversals. Since June the number has remained practically constant, because of the marked upturn in number of cars added to the inventory. The 41,400 added during the 10 months ended in October may be compared with the 76,700 installed during the five preceding years and are the best evidence that the existing supply of freight cars is considered inadequate for the present and the immediate future.

For the first time during the years since the beginning of the depression and those immedately preceding it the supply of serviceable locomotives showed a definite upward turn in the latter half of 1936. The number of locomotives on line continued to decline, but the first sharp reduction in the number of unserviceable locomotives since the beginning of the depression, amounting in round numbers to 2,900 locomotives from the high of the year, offset the decline in ownership and added about 1,000 net to the number fit for service. Locomotives stored serviceable declined to 2,271 on November 1. Just how near nothing this is, in practical effect, is indicated by the fact that the lowest figures to which stored locomotives have declined since 1923 was 3,800 in February, 1924, and that in only two other reporting periods did the number drop below 4,000. If it be assumed that all locomotives now stored and all now unserviceable are equal in value to the average of those now in active service, the restoration to serviceable condition of the present excess of unserviceable locomotives would bring up the reserve of the past autumn to a possible maximum of 5,700 locomotive units. It must be



The Remaining Locomotive Reserves Are Out of Service for Repairs

remembered that this is a nation-wide figure while peak demands are local, that they are variously timed during the year and that the stored reserves by no means represent the best of the inventory.

With these facts in mind, 4,000 locomotives, the number below which stored locomotives have seldom declined, may reasonably be considered as the minimum reserve for safety. The maximum working reserves, on the basis of the present inventory and traffic conditions of last fall, are, then, 1,700 locomotives. This is 77 locomotives less than the number retired from the inventory during the first ten months of 1936. It is a number entirely inadequate to meet the prospective traffic demands of the coming year, even without consideration of the state of obsolescence of the present locomotive ownership.

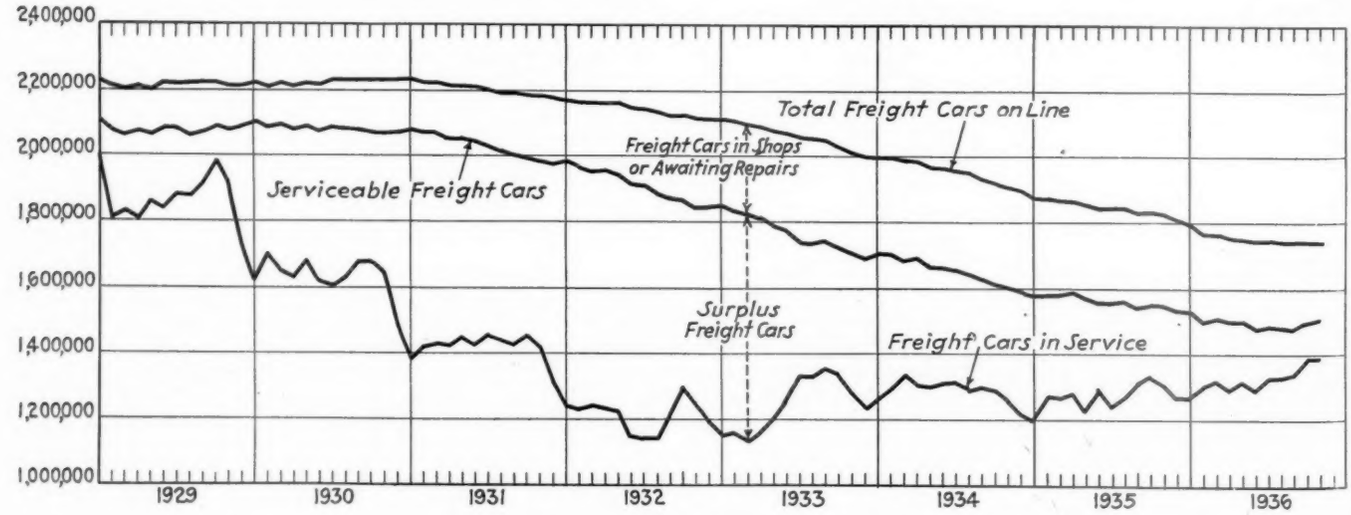
The retirement of close to 16,000 locomotives during the past seven years has improved the inventory at the bottom, but the improvement at the top by the installation of only about 3,700 locomotives has not been adequate to prevent the average age to increase. Near the end of 1933, according to the study of the age of locomotives made by Coordinator Eastman, about 54 per cent of the locomotives were aged 21 years or older. Since then nearly as many locomotives have passed the 21-year mark as have been removed from the inventory. With the meager replacements made since that time the 21-year-and-older group now amounts to well over 60 per cent of the total inventory.

The passenger-traffic outlook, which for 12 years from 1920 grew steadily more hopeless, suddenly changed from faintly hopeful to a volume which has placed an embarrassing demand on available rolling stock for the holiday peaks. This is particularly true of the eastern roads where the reduced fares which went into effect on June 1 have been remarkably effective in inducing increased railway travel. For the country as a whole coach mileage increased from about 22 per cent of the total passenger-train car mileage during the early months in the year to over 27 per cent in September, the latest month for which the figures are available. Another index of the effect of this sudden change in traffic trend in reducing the reserve of railroad-owned passenger equipment is the reduction of passenger-train-car retirements to 953 during the first nine months of 1936 as compared with annual retirements of over 3,000 during each of the preceding three years.

Trends of Equipment Design

By far the most striking fact pertaining to the cars and locomotives ordered during 1936 is the tremendous increase in the number of units ordered, when compared with the records of the preceding five or six years. Beyond this, however, several interesting tendencies of design are present.

In the case of orders for passenger-train cars the number weighing 60 tons or more are the exception rather than the rule. It is evident that the principle of weight reduction is thoroughly established. This applies not only to the equipment of more or less special character for operation in streamline articulated or partially



The Freight-Car Situation Changed During 1936

Number of Locomotives and Road Locomotive Miles, 1928-1936.

	Number of locomotives								Road locomotive-miles, Avg. per mo. (000)
		Unserviceable		Stored serviceable		In active service			
	On line Dec. 1	High	Low	High	Low	High	Low	Avg.	
1928	58,689	4,800	4,327	7,490	4,958	49,548	48,338	48,407	102,127*
1929	56,662	4,545	4,002	6,482	4,041	48,716	47,188	47,906	102,732*
1930	55,380	5,102	4,112	8,462	5,958	46,153	41,816	43,837	92,700
1931	53,791	6,836	5,216	10,361	9,531	38,938	36,054	37,545	79,850
1932	51,648	9,316	6,990	11,660	9,008	35,675	32,027	33,581	67,230
1933	49,602	11,203	9,558	9,419	5,193	33,777	31,222	32,595	65,130
1934	47,320	11,259	10,616	5,913	4,590	33,196	31,567	32,580	67,900
1935	45,528	10,582	10,127	4,778	3,030	32,374	31,233	31,275	69,040
1936**	44,239	10,825	7,927	3,054	2,043	34,041	32,374	35,701†	74,870‡

*For the peak month of October road locomotive-miles amounted to 109,977,000 in 1928 and 109,601,000 in 1929.
**Report of November 1.
†Average for 11 months.
‡Average for 9 months.

Freight Cars on Line and Surpluses, 1928-1936

	Number of freight cars					Car surpluses			
		Unserviceable							
		High		Low		High		Low	
	On line Dec. 1	Number	Per cent to total on line	Number	Per cent to total on line	Number	Date reported	Number	Date reported
1928	2,225,141	154,168	6.9	130,493	5.8	461,699	Jan. 1-7	85,825	Oct. 8-14
1929	2,219,652	145,411	6.5	122,552	5.5	447,141	Dec. 15-22	107,301	Oct. 8-14
1930	2,225,493	159,020	7.1	118,807	5.1	706,538	Dec. 23-31	373,825	Feb. 1-7
1931	2,172,990	197,289	9.1	143,289	6.5	750,697	Dec. 23-31	532,301	Oct. 15-22
1932	2,107,204	268,170	12.7	187,666	8.7	772,565	June 15-30	545,157	Oct. 15-31
1933	1,999,012	316,437	15.4	266,066	12.6	691,587	Jan. 1-14	376,818	Oct. 1-14
1934	1,892,181	301,368	15.4	286,928	14.4	435,819	Jan. 1-14	317,525	Sept. 15-30
1935	1,800,387	290,709	15.5	269,984	15.0	376,575	Jan. 1-14	208,158	Oct. 15-31
1936*	1,742,498	266,876	14.9	226,095	13.0	251,079	Jan. 1-14	112,369	Oct. 15-31

*Up to November 1.

articulated trains of stainless steel or aluminum-alloy construction, but generally to the cars designed for operation in conjunction with conventional rolling stock, in the construction of which the use of alloy steels is extending.

These light-weight trains of special construction have continued to increase in length, the most recent order placed covering two trains of 14 revenue body units each. For trains of such length only partial articulation is practicable.

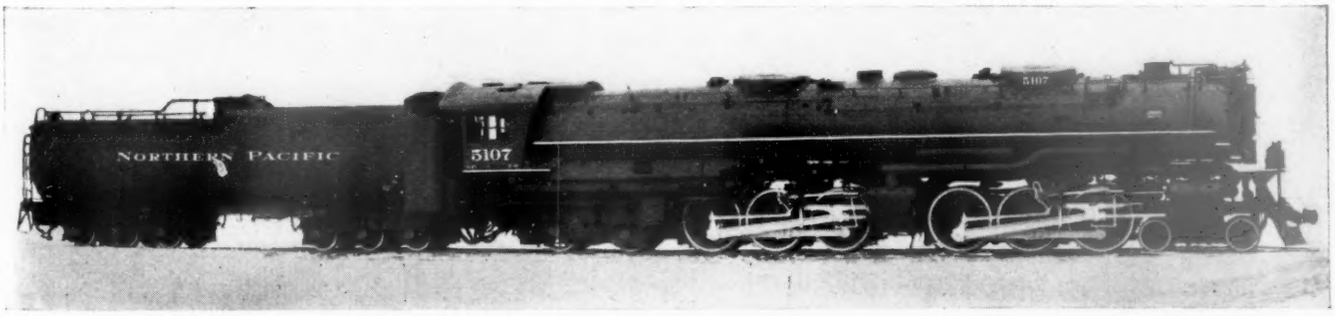
One of the notable developments of the year in passenger-car design was the successful effort to improve the riding of passenger trains made up of single-unit cars. Distinct improvements were effected in the New York Central's "Mercury" installed last summer between Cleveland, Ohio, and Detroit, Mich., by the employment of rubber draft gears, tight-lock couplers and alloy-steel truck springs of unusual flexibility. The Pullman Company has recently completed a light-weight sleeping car on which the rubber draft gears and tight-lock couplers have been installed. These factors, combined with lighter weight, hold forth hope for the suppression of the violent agitation caused by slack in starting passenger trains, which is annoying to most passengers.

The consultation of artists in the selection of architectural and decorative features of passenger-car interiors, and to some extent of exteriors as well, continues. Not only does this prevent violations of good taste to which multitudes of railway patrons are sensitive, but monotony is also avoided and interest enlivened by the bold effects which the trained artist may safely employ.

Types of motive power were further diversified during 1936 by the installation of the Besler high-pressure steam power plant in a motor-car train on the New Haven. Another application of steam which is under development by the General Electric Company is the 5,000-hp. turbine-electric locomotive for the Union Pacific. This involves a combination of the Steamotive high-pressure steam generator, developed jointly by the Babcock & Wilcox Company, the General Electric Company and the Bailey Meter Company, a steam-turbine-driven electric generator, and electric-motor propulsion. With its air-cooled condenser, even though not intended to operate at high vacuums, this locomotive involves the solution of problems which have never before been undertaken on so large a scale.

The outstanding steam locomotives built during 1936 were of the single-expansion articulated type. Several orders of these locomotives were built for heavy high-speed freight service, a service requiring high horse-

(*Continued on page 44*)



One of Several Lots of Locomotives of the 4-6-6-4 Type Built During 1936—Tractive Force, 104,500 Lb.; Engine Weight, 624,500 Lb.—Built by American

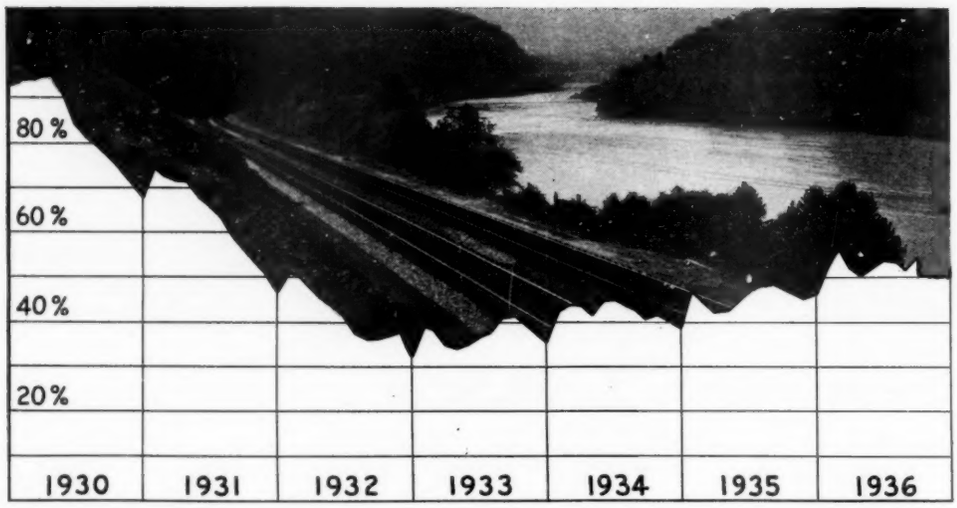


Photo by Norfolk & Western

Expenditures for Maintenance of Way and Structures, December, 1929, to September, 1936, Inclusive, Expressed as Percentages of the Average Expenditures for the Same Months, 1925 to 1929, Inclusive

Expenditures on Fixed Property Are Increasing

Outlay for maintenance of way and structures in 1936 was 41 per cent greater than in 1933 — Faster trains call for improvements as well as better upkeep

By Walter S. Lacher

Engineering Editor

THE Class I railways spent about $455,000,000 for maintenance of way and structures in 1936, an increase of $63,000,000, or 16 per cent over the outlay in 1935 and approximately $133,000,000, or 41 per cent, more than was spent in 1933, the year of the lowest outlay since 1909. This increase is manifested also in the volume of rail and tie renewals in 1936, the former amounting to about 950,000 gross tons and the latter to approximately 48,300,000, which figures exceed those of any year since 1931. That still greater activity in maintenance of way is to be expected in the future is evident from a comparison with the expenditures of predepression years, as indicated by the figures below, which show what the roads spent in the last seven years in relation to the average annual expenditures for the five years, 1925-1929, inclusive.

	Expenditures for Maintenance of Way and Structures	Percentage of the five-year average
1925-1929 average	$848,942,000	100
1930	713,341,000	84
1931	535,840,000	63.1
1932	354,921,000	41.7
1933	322,335,000	37.9
1934	365,489,000	43
1935	392,614,000	46.2
1936	455,000,000 (Est.)	53.5

A comparison of the expenditures for 1935 and 1936 by months shows that the outlays last year were from 7.2 per cent to 26.8 per cent higher than in the previous year and that, in general, the increases were greater in the first half of the year than in the second half, so far as this can be ascertained in the absence of figures for November and December, 1936. However, this comparison gives an inaccurate measure of the trend of the expenditures, as can be shown in the chart in which the expenditures by months are expressed as percentages of the averages of the corresponding months during the five years, 1925 to 1929, inclusive, because such a comparison eliminates the influence of seasonal variation in maintenance of way activities.

Definite Upward Trend

This chart shows that the lowest level of maintenance operations occurred in December, 1932, when the expenditures represented 32.8 per cent of the five-year average for December. During 1934 the average for the year was well over 40 per cent, with a peak during June and July that is accounted for by the extraordinary expenditures incurred as a result of the widespread flood damage in the western half of the Mississippi valley. The graph for 1935 shows an average in excess of 45 per cent, with a peak in January accounted for by severe winter storm troubles, and a general improvement during the second half of the year. The further improvement during 1936 is also evident, except that the percentages for January and February are abnormally high on account of the record snowfall and low temperatures in the middle west, while the disastrous floods in the east

explain the large expenditures during March. Therefore, if the peak in those three months is disregarded, it is seen that there was a definite upward trend in operations throughout the year, reaching a level in September that represented 54.7 per cent of the five-year monthly average, or the highest since September, 1931.

Employment

Employment has not increased in proportion to the increase in expenditures. The maximum force in any month during the last year was 249,223 persons, or 12,443 and 14,591 more, respectively, than the maximum

Expenditures for Maintenance of Way and Structures by Months, Class I Railroads

(thousands)

	1934	1935	1936
January	$25,164	$27,684	$30,423
February	25,125	25,552	32,414
March	28,512	27,785	34,183
April	30,137	30,810	36,310
May	35,053	34,632	40,760
June	35,612	37,039	42,644
July	34,355	38,028	42,464
August	34,196	39,083	41,394
September	31,501	36,763	42,116
October	32,627	36,336	41,866
November	27,873	31,398	.....
December	25,334	29,938	.....

forces employed in 1934 and 1935. The minimum force, 180,730, exceeded by about a thousand the minimum number of men employed in 1934 or 1935, and exceeded by only 5,277 men the smallest force employed during any month of the depression, namely, in March, 1933.

The maximum force employed at any time during 1936 was less by 80,229 than the minimum force in any month of the seven years 1923 to 1929, inclusive, and was 25,256 less than the minimum force in 1930.

However, a true comparison must take into account the difference in the hours worked per employee in the

Number of Employees, Maintenance of Way and Structures, Class I Railroads

	1934	1935	1936
January	182,993	181,789	180,730
February	183,051	179,710	206,321
March	198,309	184,671	191,571
April	202,140	193,329	221,607
May	227,552	213,254	236,631
June	236,780	228,795	245,200
July	236,425	234,632	246,756
August	231,792	230,961	247,983
September	222,386	222,929	249,223
October	217,939	218,673	243,658
November	195,217	197,297	221,187
December	180,951	184,671	.....

various years. Since the average time per employee on hourly rates increased from 2,030 in 1932 to 2,070 in 1933, 2,190 in 1934 and 2,230 in 1935, while comparisons of the monthly averages of 1935 and 1936 show a still further increase last year, it is evident that the increase in employment was actually greater than is indicated by a comparison of the number of men on the payrolls. As a matter of fact, a comparison of expenditures with compensation to employees shows that wages represented from 55.2 to 55.9 per cent of the total expenditures from 1930 to 1935, inclusive, and 55.3 per cent for the first 8 months of 1936, compared with 54.2 per cent in 1929.

While no statistics are now available upon which to develop a breakup of the expenditures for maintenance of way and structures in 1936 into the various primary accounts, it is evident from the figures for rail and tie renewals that the increase in the outlay for track maintenance was relatively greater than the increase in the total expenditures. Obviously, tracks and track supporting structures must receive primary attention, and, in addition, many railways have had to give special attention to the tracks on particular routes to prepare them for accelerated train speeds. As a result, other items of the fixed properties have received less attention, so that the maintenance of buildings, for example, has been far from adequate. A recent survey showed that painting has been seriously neglected on many roads.

Ties and Rails

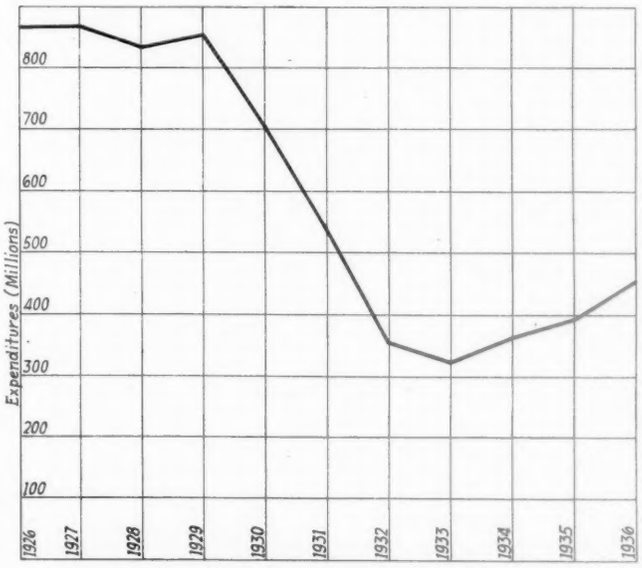
Maintenance officers have declared repeatedly during the depression that tie condition has been maintained with far greater vigilance than rail condition. Furthermore, since the wear of rails is directly proportional to the volume of traffic while the deterioration of ties is influenced only to a minor extent by use, the need for rail renewals declines to a much greater extent with decreasing traffic than is the case with ties. This is apparent in the relative decline in the renewals of these two items during the depression. Thus, the use of new rails in replacement in 1932, the low year for rails, represented a decline of 80.5 per cent from the average for the five years 1925-1929, inclusive, whereas, the decline in tie renewals (the low year was 1933) amounted to 52.7 per cent. It follows, therefore, that a relatively greater in-

Rails Laid in Replacement

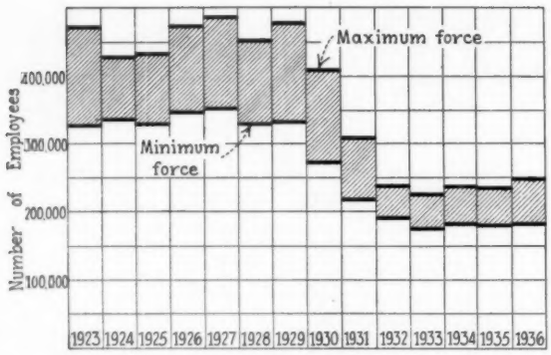
Year	New	Old	Total
1926	2,209,873	1,608,254	3,818,127
1927	2,124,765	1,694,350	3,819,115
1928	2,080,277	1,725,374	3,805,651
1929	1,958,489	1,651,966	3,610,455
1930	1,517,002	1,156,672	2,673,674
1931	984,900	730,005	1,714,905
1932	394,536	402,784	797,320
1933	403,254	459,044	862,298
1934	625,069	361,147	986,216
1935	582,794	576,245	1,159,039
1936	950,000 (Est.)	.....	.....

crease in the renewal of rails than of ties would be required in an effort to attain a normal state of maintenance, and this has proved true, as shown in the chart of rail and tie renewals expressed as percentages of the average renewals for the five years 1925-1929, inclusive.

The rail renewals (new rail) for 1936, about 950,000 tons, represent an increase of 140 per cent from the low



Expenditures for Maintenance of Way and Structures, Class I Railroads, 1926 to 1936, Inclusive

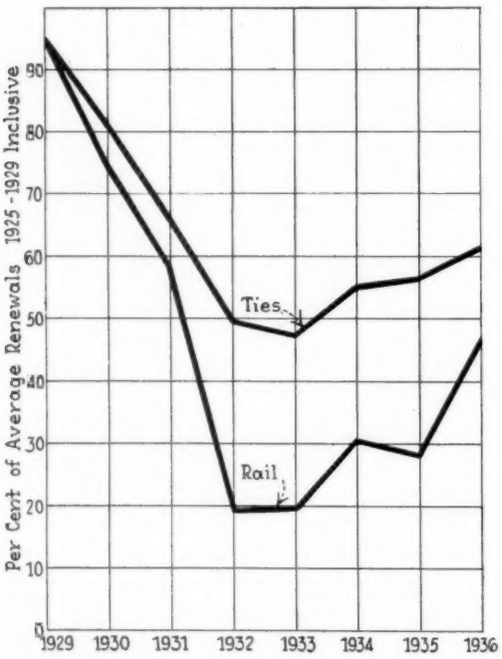


Number of Employees, Maintenance of Way and Structures, Class I Railroads

level of 1932, while the crosstie renewals for 1936, about 48,300,000, comprise an increase of only about 30 per cent. However, a different aspect is presented by a comparison of last year's rail and tie program with that of the predepression period; since this shows that rail renewals in 1936 amounted to but 47 per cent of the predepression rate, whereas tie renewals amounted to 61 per cent. In view of the pron unced increase in rail orders during the last three months, it is anticipated that there will be a marked further increase in rail replacements during the present year, whereas the increase in tie renewals will, no doubt, proceed at a more moderate rate.

Crossties Applied in Renewals

Date	All	Treated	Per Cent of Treated Ties
1920	86,829,307	.....	....
1921	86,521,556	.....	....
1922	86,641,834	.....	....
1923	84,434,985	.....	....
1924	83,073,059	.....	....
1925	82,716,674	.....	....
1926	80,745,509	55,557,706	68.8
1927	78,340,182	57,082,993	73.0
1928	77,370,491	59,157,540	75.5
1929	74,679,375	59,047,380	79.1
1930	63,353,828	49,720,080	78.5
1931	51,501,659	39,827,791	77.3
1932	39,190,213	29,435,055	75.2
1933	37,295,716	26,339,516	70.8
1934	43,306,205	31,808,339	73.5
1935	44,351,900	33,281,314	75.
1936	48,300,000 (Est.)	37,000,000 (Est.)	....



Rail and Crosstie Renewals—Percentages of the Average Annual Renewals, 1925 to 1929, Inclusive

More Treated Ties

While no figures for 1936 are now available showing the ratio of treated to untreated ties inserted in track, it is significant that the treated ties applied in 1935 represented 75 per cent of the total, compared with a maximum of 79.1 per cent attained in 1929. The lowest proportion of treated ties since 1926 was used in 1933, when efforts to gain the temporary advantage of lower first cost resulted in the use of treated ties for only 70.8 per cent of the total. It is anticipated that the compilation of crosstie figures for 1936 will indicate the application of about 37,000,000 treated ties. There is also a well defined trend toward the use of larger tie plates and plates provided with rail fastenings independent of those that secure the plate to the tie. The most common type for this purpose is the six or eight-hole plate, although it has been observed that purchasers of such plates have not always applied the independent plate-holding spikes or lag screws.

The trend toward a far greater degree of standardization in rail sections is evidenced by the extent to which rail orders are being confined to the 112-lb. and 131-lb. RE sections. The demand for rail that has been subjected to either the normalizing or controlled cooling processes is indicated by the measures that the mills have taken to provide increased capacity for rails so treated. While the enforced reduction in rail renewals during the depth of the depression provided a marked impetus to rail-end welding, the subsequent increase in rail buying has not resulted in any decline in the application of this and other means of rail conservation. Rather, the reverse has been true, and in addition there has been an increase in the practice of rail-end hardening. Some progress has been made in the processing of rail ends at the mills, but the end-hardening of rails in track remains the predominating practice.

The widespread publicity that has been accorded the experience of the Delaware & Hudson with Thermit butt-welded rail has given rise to installations of rail welded in long stretches on other roads. The Bessemer & Lake Erie has butt-welded the rails in a mile of track that is equipped also with GEO fastenings, and this test installation is being subjected to a close check on its behavior in service. The Northern Pacific has installed stretches of approximately 4,000 ft., each, of butt-welded rail in two tunnels, the distinctive feature of which was the completion of all the welding work on cars and the subsequent delivery and unloading of the continuous rails in the tunnels.

Track for High-Speed Trains

With the marked expansion during the year of the line mileage of high-speed train runs, more maintenance officers have been compelled to address themselves to the task of refining line and surface to meet the demands of the faster schedules. Of equal importance has been the keying up of their organizations to higher standards of discipline and responsibility, not only to insure smooth riding and safety of operation under the more exacting requirements, but also to impress on the men the importance of handling their work in a manner that will result in a minimum of slow orders.

The altered significance of the slow order that has been effected by the marked acceleration of train speeds was brought to the attention of railway men in an ad-

dress presented before the Western Railway Club last March by Robert Faries, assistant chief engineer, maintenance, of the Pennsylvania. Conclusions, based on extensive tests, demonstrated in specific figures what many had learned in less definite terms, namely, that even a very few slow orders can serve as a positive barrier to the maintenance of high speed train schedules. It is not too much to say that the facts thus disclosed mark the beginning of a new conception of the requisites of sustained high speeds in rail transportation.

While most of the new high speed schedules have been established with a minimum revision of alinement for the purpose of reducing the rate of curvature, there is an outstanding exception in the work that has been in progress on the Atchison, Topeka & Santa Fe between Chicago and Los Angeles, Cal., which is without precedent in point of the magnitude of line revision work undertaken solely for the purpose of reducing the rate of curvature.

Taking into account the limitation on superelevation necessarily imposed by slow moving trains, even a 1-deg. curve demands speed restrictions to rates below those readily attainable with most of the new power units, while a 1-deg. 30-min. curve has come to represent the maximum rate of curvature that does not introduce practical limitations on scheduled speeds. This conclusion not only points to projects for line revision but will also have a definite influence on alinement standards on new line construction in the future. This is attested by the fact that the Santa Fe revised the alinement on that portion of its Amarillo-Las Animas line that had not been placed under contract at the time that the studies of the requirements for high speed operation on the Chicago-Los Angeles line were in progress. As a result the part of this line between Boise City, Okla., and Las Animas, Colo., was built with no curve in excess of 1 deg. 30 min., whereas it had been planned to use curves up to 4 deg.

Better Grading Practice

Track maintenance in the future will be facilitated by the greater refinement in roadway construction that has been in progress for several years, and railroad roadbed grading during the last year evidences the increasing emphasis that is being placed on methods that make for solidification of embankments. The change to free-wheeled and crawler-mounted earth-moving equipment has resulted in a return to the methods of forming fills in layers that prevailed in the days of teamwork, but material laid down in layers under the weight of the heavy loads now being hauled is compacted even more effectively than under the hoofs of animals or the wheels of horse-drawn wagons or wheelers. Some railways have made assurance doubly sure by introducing specification stipulations that call for the rolling, or wetting, or both, of the material as it is being spread, in some cases insisting on the use of the sheeps-foot roller. As a result of the solidification thus assured, the time-honored provision for shrinkage (in the vertical direction) was eliminated on two important railway grading projects carried on during the last year. Some projects recently under observation also evidence the urge to insure a higher degree of perfection in drainage that was formerly deemed adequate. In general, therefore, it may be said that "excess maintenance" on new lines now being built or to be constructed in the future will be without any practical significance.

Measured by the magnitude of maintenance of way operations in the late 1920's, the expenditures during 1936 were still at a low level, but as will be noted in the chart at the head of this article, there has been a progressive increase in activity from month to month throughout the four years since December, 1932, when the expenditures reached the low level of $21,365,000, or only 32.8 per cent of the average for December in the five years, 1925 to 1929, inclusive. While it would be difficult to determine just when maintenance operations reached a level that effected a transition from the period of declining condition to one of progressive improvement in the upkeep of the fixed properties as a whole, there is no question as to the improvement that has taken place in the tracks of important main lines during the last two years. With the expansion of the programs during the current year it will be possible to take up some of the deferred maintenance that has accumulated on the less important lines and in buildings and other elements of the fixed properties.

The Second Year of the A. A. R.

(Continued from page 24)

made in expediting payments and reducing the accounting costs of accounts between the government and the carriers.

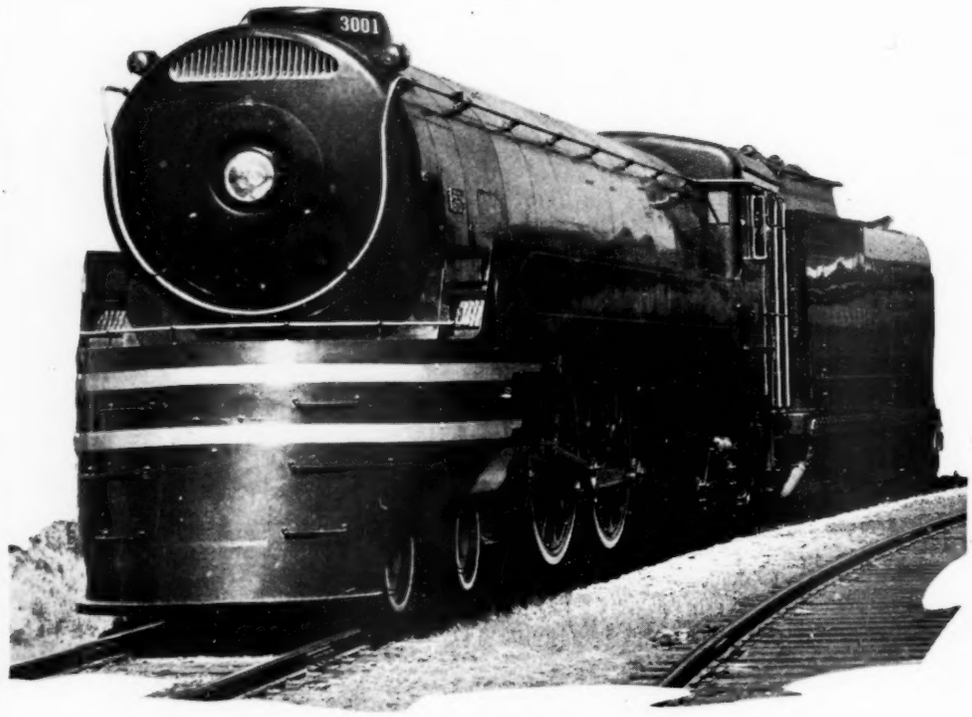
The only meeting of the Motor Transport Division held this year, aside from several conferences, was that of the general committee in Chicago on July 20. The purpose was to make plans for reorganization of the division so that it may again become useful in the field for which it was organized. It was expected to bring these plans to fruition by the end of the year.

Public Relations Department

Under resolutions adopted by the member roads in November, 1935, followed by the approval by the board of directors of a detailed program in June of this year, the association has embarked upon an extensive public relations program intended to give the public a better understanding of what railroads are, how they work, what they mean, and how well they are doing their job. The association staff for this purpose, under the direction of Robert S. Henry, assistant to the president, was somewhat expanded and, although not yet completely organized, already has under way eleven projects and eight services for the purpose of telling the general story of the railroads on a national scale and furnishing material and such other aids as may be wanted by the individual railroads. Under the plan as developed it is contemplated that the major work of improving the public understanding and appreciation of railroads shall rest on the individual railroads and their employees but the association has not only increased its distribution of material to the newspapers and other publications but has also engaged in a plan of national advertising in magazines of general circulation which has been supplemented by co-operative and individual advertising by the railroads in their local newspapers. The first advertisement was inserted in 38 national magazines in June having a total circulation of over 20,000,000, captioned "We're doin' O. K., buddy," and has been followed by others in succeeding months.

There has also been a supplemental distribution of advertising material through railroad employee magazines, booklets, posters, display cards, dining car menus, timetables and other like channels.

Recovery Under Way in Canada



Canadian Pacific "Jubilee" Type Locomotive

Carloadings are up by 10 per cent over 1935 but operating expenses have risen also—Problem of excess transport plant remains unsolved

By Our Ottawa Correspondent

CANADA'S steam railways during 1936 enjoyed their share of the business recovery which became general in the latter part of the year. Revenue car loadings, which are usually regarded as a reliable barometer of domestic trade, showed an average increase in the year of about 5 per cent and near the end of the year they were over 80 per cent of what they were in 1926, a normal pre-depression twelve-month period. The Canadian National in the year showed an increase in gross revenues of 7 per cent and the performance of the Canadian Pacific was slightly better. There was a considerable increase in traffic; but higher operating costs, unemployment relief projects, heavy flood damage in the spring and difficult snow and ice conditions in January and March kept down the net revenue of the roads, and it is estimated the operating net of the Canadian National will be about $14,000,000 and that of the Canadian Pacific a little over $20,000,000.

C.N.R. Deficits Decrease

In the last session of parliament over $39,000,000 was voted to take care of deficits to be incurred by the publicly-owned road during the year. It is expected all of that sum will be required for the 1936 operations, but this was over $8,000,000 below that of the previous year and prospects for 1937 are even brighter. There has in the past three or four years been a substantial reduction in the interest bill due the public. It reached its peak in the year 1932 when the figure was almost $57,000,000. The next year it declined to $56,500,000, the following year to slightly over $55,000,000, and for the year 1936 the amount is about $49,000,000.

A notable feature of the railway year in Canada was the unique scheme to absorb a small army of unemployed single homeless men who had been let loose with the abolition of the costly relief camps. The employment of over 14,000 men on maintenance of way work on both the principal railways not only performed a real service for the federal government in solving a difficult problem but it also enabled the railways at a minimum cost to restore their tracks and yards in many parts of the country to a more efficient condition. A great deal of credit will have to go to Humphrey Mitchell, formerly a Labor member of the House of Commons from Hamilton, Ont., who devised the scheme, while the railways themselves must be commended for their cordial co-operation in making the plan work.

There were sporadic outbreaks during the year of the campaign for amalgamation of the railways under private control but there is no indication that substantial progress was made. A linking of the two roads, under either private or public control, today appears to your correspondent as it has been for the past fifteen years as mechanically hopeless as it is politically impossible. The Canadian people have had enough grief from their compulsory ownership of one road without tackling a combination of both of them, and they have seen enough of the mechanical difficulty of efficiently managing one road without caring to see that difficulty multiplied by two. A Canadian railway man who is intimate with operating conditions in the United States has more than once remarked that the Mississippi river was not the only reason why there were no transcontinental railways in the United States. A better reason was that no one in that country felt capable of tackling such a job.

Co-operative Economies

What the Canadian taxpayers are more deeply interested in is a lessening of the annual burden imposed by

the operation of the Canadian National. This obviously can be accomplished in two ways, either by operating and administrative economies or by increased traffic or both. The economies can be achieved both within the personnel of the road and also through co-ordination of certain auxiliary services common to both roads. It will be remembered that the Canadian parliament during the Bennett administration passed a statute declaring it to be the duty of the managements of the two roads to get together and devise co-operative economies. Some of these have already been effected, but some observers suggest that much more can be done in the direction of wiping out an expensive duplication of ticket offices and station facilities in the smaller towns and cities and joint use, to a greater extent, of equipment at divisional points. It is now apparent, however, that the once proposed merger of the railway express companies and the telegraph services will not receive any more serious consideration.

During a recent public address Sir Edward Beatty, president of the Canadian Pacific, made some significant statements regarding co-operation between the two roads, as well as a warning against going "streamline crazy." He resented the suggestion that the idea of co-operative economies originated with the taxpaying public or with parliament and pointed out certain limits to co-ordinated savings, one of these being imposed by consideration for the men presently employed by the roads.

The Lord Mayor of London, England, Greets C.N.R. War Veterans at Opening of London, Ontario, C.N.R. Station

Regulatory Body to Be Reorganized

In this connection, it is interesting to recall that at the last session of parliament some minor amendments were made to the Bennett bill providing for co-operative savings by the two roads, but when it came to making specific provision in the amending legislation for employees who lost their jobs because of co-operative savings the Minister of Transport, Hon. C. D. Howe, properly reminded the Labor members, who demanded such provision, that it would be better to leave this matter to settlement between the managements of the two roads and their respective employees and remarked that in previous times these two parties had been able to compose their difficulties better without the interference of parliament. There is little doubt, reverting to another feature of Sir Edward Beatty's address, that the matter of streamlined trains and other more recent attempts to capture the public imagination as well as business is somewhat different in Canada from the situation in the States. This country is thinly populated and the return on such outlay in Canada would be relatively much lower than in the United States, even if successful.

Buffet Coach in New C.P.R. Streamliner

Interest now centers upon the proposed recasting of the Canadian rate-controlling body. Mr. Howe in a Montreal speech in November intimated his intention of bringing in legislation at the parliamentary session which opens at Ottawa on January 14 to enlarge the jurisdiction of the Dominion Railway Board and at the same time to reduce its personnel from the present statutory number of six to three. The Minister of Transport would like to set up a centralized or federal control over railway, telegraph and telephone, water and motor highway tolls, but it now looks as if the jurisdiction will be extended only to water rates, in addition to those now existing, namely, railway, telegraph and telephone. Regulation of water rates, both on the Great Lakes and inter-coastal, will come because water operators want it.

Provincial rights are just as much a football in Canada as state rights are in the United States, and they can be and are used to deadly effect. Truck and bus operators appeared before the now famous Duff Commission in 1932 and showed no enthusiasm for federal control over their rates or operating conditions, and not long ago they found a strong friend in the Ontario government. Even though Premier Mitchell Hepburn's administration in that province is of the same political complexion as the King Ministry at Ottawa, a prominent member of Hepburn's Cabinet, Hon. Thomas McQuesten, Minister of Highways, bluntly told the truck and bus operators to beware of federal control of their business.

The federal government can, of course, exercise control over interprovincial truck business and there is considerable between Ontario and Quebec but it is now doubted if the cost to wield such control would be worth the candle, and it seems likely that this will not be attempted in the new legislation. It is to be noted that the Canadian provinces are relatively large compared to the American states; hence a much higher proportion of

traffic is intraprovincial than is intrastate. Mr. Howe is persuaded, though, that a more closely co-ordinated supervision over rates charged by the railways and by the water carriers, as well as those imposed at the various ports on both coasts will be to the advantage both of the shippers and the transportation companies. He has established a national harbor board and it has already made some progress in getting closer harmony between commercial interests and the carriers.

The reviews of developments during the year by the heads of the two principal railways will serve to complete the picture of what has been, in many regards, the most satisfactory year in some time.

Net Increasing Slowly

By Sir Edward Beatty, G. B. E.*

A year of heartening progress—some such words as these come naturally to the mind when one comes to consider the past twelve months and what they have meant in Canadian economic affairs. We have seen progress reflected in busier factories, a larger turnover of commodities, the increased production of many primary materials, and such a reduction of unemployment as naturally follows upon a revival of trade and industry.

Unfortunately, the drought conditions of recent years have continued in Western Canada.

While these conditions have more directly affected farm owners and workers in those areas, they were bound to be felt in other lines of activity, and of these the railways stood to lose most, since the haulage of grain to water ports is normally so large a proportion of their annual business. All-Canadian carloadings of grain and grain products for the first eleven months of the past year increased over the same period of 1935 by 24,660, to a total of 321,247. Of this increase only about one-third was loaded in the West. It is interesting to compare these figures with those of the year 1926, a year in which the Western crop was 381,000,000 bushels, or about what we have been accustomed to consider an average normal crop. In that year Western grain and grain products carloadings for the first eleven months totaled 326,527 cars, while in 1936 they were 224,625, a loss of over 100,000 cars. It is hardly necessary to dwell upon the meaning of this when translated into terms of railway revenues.

1926 and 1936 Compared

The total number of freight cars loaded in all Canada during the first eleven months of the past year was 2,294,212, an increase over the same period of 1935 of 102,567, and with this the railways have reason to be gratified. It has about it the elements of a pleasant picture. If we again turn back to the year 1926, we find that total freight loadings for the same period of that year amounted to 2,978,874 cars, or 684,664 cars more than we have handled in the eleven months of 1936.

The Canadian railways have still a long way to go before they recover the ground which, for one reason or another, they have lost over recent years. For the first eleven months of this past year gross revenues of the Canadian Pacific have approximated $126,310,000, an increase over the same period of 1935 of $8,212,000. This is encouraging evidence of larger business movement, but against it we have to set the fact that for the first ten months of this year, the company's operating expenses increased over those of the same period of 1935 by $7,359,820. It will at once be recognized that the increase in business has produced practically no additional profit for the owners of the railway, and is far from providing anything in the nature of surplus funds available for capital expenditures.

Such figures as these are serious and disturbing to those of us whose life work it is to operate railways. They can be no less alarming to those who own the railways, and since every tax-paying citizen of Canada is in the latter class, it should follow that Canadians are eagerly looking to see what we are doing about it, and how we are shaping our course so that our railways may maintain their proper position in the national transportation system, and may continue to serve the country's progress adequately. The experience of this company last summer when we were exhibiting our new light, fast trains convinces me that the people of Canada are keenly interested in what we are trying to do to meet changing conditions.

Improved Equipment Costly

All this being so, it perhaps is desirable to turn for a moment to what we have done over the past twelve months in the way of modernizing equipment and generally bettering services offered to our patrons. The demand for the installation of air-cooling upon our passenger trains became insistent as soon as that operation was proven practicable. After exhaustive experiment we set about installing the mechanism best suited to our use into modernized cars, as quickly as funds available for the purpose would permit. This was a costly procedure, brought upon us at a time when revenues were drastically below what we had once believed to be normal, and it is to be remembered that this important addition to overhead and operating costs was not accompanied by any direct increase of revenues. The passenger paid no more for the increased comfort of the air-conditioned car than he did for his transportation in the days before he demanded and received this amenity. Considering relative costs and available revenues, we have progressed far in the installation of air-conditioned equipment. The program is continuing.

These new, light and fast trains indicate a program of definite progress in the direction of provision of improved standards of service and comfort. The extent to which we can carry this modernization of our equipment will depend on the success which may be obtained in the direction of solving the general transportation problems of the country. The railways must progress, but that progress will be conditioned very directly by success in eliminating wasteful duplication of transportation between the railways and unfair and destructive competition of other modes of transportation.

* Chairman and President, Canadian Pacific.

C.N.R. Outlook Brightens

By S. J. Hungerford*

The outstanding feature of the year 1936 is that industrial activity has increased to a point where continued steady improvement may be expected and planned for. The gross revenues of railways are normally a sensitive index of business conditions, although of late years disturbing factors have caused the revenues to increase at a slower rate than general business activity; nevertheless, the increases in railway gross revenues have been of such an order as to justify confidence in the outlook

* Chairman and President, Canadian National.

and to enable the Canadian National to plan constructively for the future. The gross revenues for the years 1933 to 1936 and the increases, year by year, are as follows:—

Year	Gross Revenues	Increase over 1933
1933	$148,519,742	.....
1934	164,902,502	$16,382,760
1935	173,184,502	24,664,760
1936	184,500,000	35,980,258

Railway traffic is drawn from all types of industry. It would appear that a large measure of recovery has taken place in general manufacturing and trade. Of particular note is the extensive development in mining in territory contiguous to the Canadian National, particularly in Northern Ontario and Quebec. Agricultural production suffered a set-back both in the east and the west, but the freedom with which the carry-over of grain was marketed afforded some measure of compensation. Moreover the carry-over into the crop year 1937-38 will not be the disturbing factor which it has proved to be in the past.

The production of capital goods, apart from the mining industry, has not as yet responded to the industrial recovery to the same extent as the production of consumers' goods, but with public confidence restored it is to be anticipated that the production of capital goods will become more general and will prove to be a stimulating factor. In view of the increasing traffic which may be anticipated, it is to be expected that the C.N.R. itself will again be in the market for capital goods, the production of which is characteristic of the second stage of recovery from an industrial depression.

Under the stress of the depression the Canadian railways were forced to put wage deductions into effect which were returned in some degree as railway revenues increased. Wages during 1936 were maintained at a level 10 per cent below those in effect in 1929. Negotiations between representatives of all Canadian railways and of organized labor were conducted during the year with regard to a further restoration of wage deductions. It proved impossible to reach agreement and recourse was had to a Board of Conciliation under the Industrial Disputes Act, which has not yet rendered its decision.

From an operating standpoint the years 1936 witnessed a continued improvement in operating performance indicative of the ability of the railway to carry increased traffic economically. The year, however, was marked with extreme difficulties due to severe winter conditions and flood damage. The damage through floods was altogether exceptional. Many miles of line in British Columbia were out of service for a considerable period and required extensive rehabilitation while in Eastern Canada the most serious damage was the loss of the Fredericton Bridge over the St. John River.

Throughout the year the problem of competition with other forms of transport received earnest consideration, but it is becoming increasingly evident that until such time as the competitive situation receives some adequate form of treatment by governmental authorities to place competition on an even footing, railways must continue to bear an undue burden from uneconomic competition. The continued wastage is deplored. The benefits to the few are more than offset by the economic waste which is borne by the community at large. It is a situation which the railways alone cannot hope to solve and is one which urgently calls for attention.

During the year the company took delivery of the equipment ordered under authority of the Supplementary Public Works Construction Act—1935, consisting of the following:—

5 Locomotives—Northern Type, 6100 class
5 Locomotives—Northern Type, 6400 class
5 Locomotives—Mikado Type, 3800 class
250 Gondola cars.
400 Automobile cars.
80 Sand cars.
450 Freight refrigerator cars.
8 Snow plows.

The stream-lined passenger locomotives of the 6400 class have proved to be very satisfactory in service, being both reliable and economical. Apart from these equipment purchases, expenditures on capital account have been almost entirely limited to those essential for safety in operation. Construction is proceeding on the extension of the line from Noranda to Senneterre through the mining section of Northwestern Quebec. This territory is responding to mining development to a gratifying extent. It is one of the bright prospects of the Canadian National that so much of the mining territory is contiguous to its lines.

The board of directors which replaced the board of trustees for the management and direction of the Canadian National took office on October 1, and it is my pleasure as president and chairman of the board to record the earnestness with which the board is dealing with the various problems of the railway. For the fifth successive year the necessary cash required to meet the income requirements of the system will be reduced. Canada is, unquestionably, entering the second phase of recovery from the depression and the country may look forward with confidence to recovery in all lines of trade. The improved general outlook may be regarded with restrained optimism.

Three of the Canadian National's New "6400" Locomotives

Mexican Railways Experience Further Gain in Traffic

The Five New Narrow-Gage Locomotives which were Purchased in 1936 by the National of Mexico for Use on the Interoceanic

Gross revenues reach all-time high but expenses increase faster so that net declines

REFLECTING substantial gains in the volume of freight and passenger business carried, gross revenues on the National Railways of Mexico during the first nine months of 1936 increased to a new all-time high mark, surpassing even the previous peak year of 1929. This improvement, which was reflected in nearly all classifications of traffic, is attributed to a general quickening of business activity throughout the country, and especially in certain branches of mining and agriculture. Counteracting the higher gross income, however, was a disproportionate increase in expenses, which resulted in a rather substantial reduction in net revenues from railway operations. While the figures and other data presented in this review apply only to the National Railways of Mexico, this system, with its 8,131 miles of line, including 1,276 miles of narrow-gage line, operates about 75 per cent of the total railway mileage in Mexico. Furthermore, the conditions which confront this system apply in the main to the other railways of Mexico.

Expenses Increase

Among the factors that contributed to the unusual rise in expenses were increases in employees' compensation, totalling about $14,000,000 annually, which went into effect during the year. Moreover, because of restricted expenditures during the depression years, deferred maintenance had accumulated to a point where it was necessary to spend larger sums on track and equipment repairs and for shop machinery, rolling stock and roadway facilities. Another factor that tended to increase operating expenses out of proportion to the gain in business was the necessity, in view of more intensive highway competition, of providing faster and more frequent train service and of modernizing passenger service.

As a result of the abnormal expenditures that were made to meet these exigencies, operating expenses during the first nine months of 1936 increased 18.1 per cent, as compared with the similar period in 1935, while gross revenues expanded only 8.8 per cent, thereby resulting in a reduction of 20.3 per cent in net revenues from railway operations. The operating ratio rose from 76 per cent to 82.5 per cent.

Relations between the management and labor on the National of Mexico during 1936 was marked by some perturbation, although the differences were composed and have been superseded by a more sympathetic attitude on both sides. The most serious incident occurred at 5 p. m. on May 18, when 48,000 employees, comprising the Union of Railroad Workers of Mexico, went on strike, the principal demand being for higher compensation. This strike was settled almost immediately and a new contract was negotiated with the employees which granted the $14,000,000 increase in compensation men-

Table I—Classified Freight Transported in Tons (Nine Months)

	1936	1935	Inc.	Dec.
Pulque (alcohol beverage)	81,824	80,472	1,352	.....
Rice	36,610	45,726	.....	9,116
Fuel oil	276,952	264,476	12,476	.....
Cotton	97,236	63,384	33,852	.....
Sugar	172,573	135,716	36,857	.....
Coffee	44,255	36,583	7,672	.....
Coal	437,934	191,722	246,212	.....
Charcoal	104,702	118,550	.....	13,848
Cement	132,201	122,005	10,196	.....
Beer	70,934	66,290	4,644	.....
Coke	238,974	221,559	17,415	.....
Construction steel	43,230	50,823	.....	7,593
Fruits	427,132	322,856	104,276	.....
Beans	70,253	71,300	.....	1,047
Gasoline	191,099	161,343	29,756	.....
Cattle	122,106	103,165	18,941	.....
Flour	84,023	74,977	9,046	.....
Lumber	250,548	265,424	.....	14,876
Corn	361,499	418,179	.....	56,680
Lard	13,969	14,822	.....	853
Machinery	59,944	22,652	37,292	.....
Bullion	161,800	128,363	33,437	.....
Petroleum	200,387	169,415	30,972	.....
Minerals	900,723	897,715	3,008	.....
Wheat	202,363	159,426	42,937	.....
Salt	55,532	63,892	.....	8,360
Liquors and wines	23,953	10,921	13,032	.....
Miscellaneous	2,320,604	2,230,181	90,423	.....
Total	7,183,360	6,511,937	783,796	112,373

Net increase, 671,423 tons

tioned previously. Indicative of the relations that now exist between labor and the management is the fact that Juan Gutierrez, general secretary of the union, had been elected a member of the board of directors of the railway. To handle the increased volume of business that was offered to it during the year this railroad had to add about 3,800 workers to its payrolls.

During the first nine months of 1936 gross earnings of the National Railways of Mexico totaled $93,544,987 as compared with $85,963,338 during the corresponding period of 1935, an increase of 8.8 per cent; freight earnings increased from $60,577,309 to $66,396,280 (9.6 per cent); passenger revenues from $16,471,415 to $18,349,256 (11.4 per cent); and miscellaneous earnings from $1,435,659 to $1,782,276 (24.1 per cent). Express earnings decreased from $7,478,955 to $7,017,175 (6.2 per cent). Operating expenses increased from $65,324,528 to $77,106,171 (18.1 per cent), with the result that net revenue from railway operations dropped from $20,638,810 to $16,438,816 (20.3 per cent).

Passenger Service Modernized

The increase in passenger business has been accomplished in the face of intensified competition on the highways. To achieve this end the company has increased the number and speed of passenger trains, has offered frequent excursions and special week-end rates and in other respects has modernized its service. An example of the improved type of service is the "Rapido de Laredo," an air-conditioned train which now travels the 802 miles from Mexico, D. F., to Laredo, Texas, in 25 hr. 45 min., a reduction of more than 3 hr. as compared with the best previous schedule. Air-conditioned trains are also operated between Mexico, D. F., and El Paso, Tex., and between Mexico, D. F., and Guadalajara, Jal., while numerous mixed trains have been converted into passenger trains.

The volume of freight traffic, by classifications, that was handled during the first nine months of 1936 and the same period of the previous year is shown in Table I. From this it will be noted that 20 classifications showed increases totaling 783,796 tons, while 8 classifications showed decreases aggregating 112,373 tons, resulting in a net increase of 671,423 tons.

As revealed in Table II, the number of loaded cars interchanged for export by rail showed a decrease of 3,225 during the first nine months of 1936 as compared with the like period of 1935, in spite of the fact that the prevailing rate of exchange (3.60 pesos per American dollar) continued to favor exports. Cars interchanged at water ports for export increased slightly (1,590 cars), but not sufficiently to overcome the decrease in exports by rail. The number of cars interchanged for import by rail showed no change while at water ports there was a small increase.

Operating Statistics

The statistics given below, which cover the first nine months of 1936 in comparison with the corresponding period of the previous year, give a picture of the trend of operating performance during the year.

Total locomotive-kilometers, including work trains, increased from 27,017,970 to 28,908,752 (7.0 per cent); passenger train-kilometers from 7,964,331 to 8,697,234 (9.2 per cent); freight train-kilometers from 9,627,298 to 10,973,947 (14.0 per cent); mixed train-kilometers, continuing the trend that has prevailed for a number of years, decreased from 3,560,571 to 3,190,697 (10.4 per cent); and work train-kilometers increased from 118,430 to 128,696 (8.7 per cent). Total train-kilometers increased from 21,270,630 to 22,990,574 (8.1 per cent); passenger car-kilometers from 66,017,332 to 70,222,269 (6.4 per cent); loaded freight car-kilometers from 151,124,024 to 160,763,222 (6.4 per cent); and empty car-kilometers from 72,793,903 to 73,847,830 (1.4 per cent). Total empty and loaded car-kilometers increased from 223,917,927 to 234,611,052 (4.8 per cent).

Table II—Loaded Cars Interchanged (Nine Months)

	Imports		Exports	
	1935	1936	1935	1936
Laredo	4,264	4,585	7,161	3,897
El Paso	1,362	1,285	2,112	1,835
Eagle Pass	841	690	981	873
Brownsville	203	110	403	827
Total	6,670	6,670	10,657	7,432
WATER PORTS				
Tampico	7,563	10,309	951	1,128
Vera Cruz	5,929	4,984	1,521	2,616
Manzanillo	24	5	660	978
Total	13,516	15,298	3,132	4,722

The number of cars loaded, including those received from connecting lines, increased from 330,590 to 356,633 (7.9 per cent). Net ton-kilometers handled increased from 3,700,218,000 to 3,860,717,000 (4.3 per cent) and gross ton-kilometers from 8,788,784,000 to 9,170,704,000 (4.3 per cent). The percentage of loaded car-kilometers to the total increased from 67.5 to 68.5. Freight car-days increased from 4,473,960 to 4,542,133 (1.5 per cent), while car-kilometers per car-day jumped from 50 to 51.7 (3.4 per cent), and the number of freight cars on line daily increased from 13,971 to 14,425 (3.2 per cent).

The New Passenger Station of the National of Mexico at Tampico, Tam.

Net tons per train-kilometer decreased from 341 to 320 (6.2 per cent) and gross tons per train-kilometer from 765 to 725 (5.2 per cent). The average speed of freight trains increased from 22.7 to 23.2 kilometers per hour (2.2 per cent). Owing partly to the increase in traffic, which required that engines of low tractive power be called into service, motive power utilization dropped from 76.5 per cent to 73.4 per cent. The percentage of serviceable locomotives to the total increased from 65.1 to 69.0 and the percentage of serviceable cars advanced from 85.3 to 87.0. The quantity of fuel oil consumed per 1,000 gross ton-kilometers in freight-train service decreased from 44.3 to 43.9 liters (0.9 per cent) and per locomotive-kilometer from 27.8 to 26.6 liters (4.3 per cent).

Reflecting the higher wages, the labor cost for locomotive repairs per 1,000 kilometers run increased from

(*Continued on page 97*)

Financial Outlook Is Improving

Security prices higher, new issues mount sharply, some dividends raised, reorganizations lag

By J. G. Lyne
Financial Editor

THE year just past was one of substantial improvement in the financial position of the railways—for which thanks are due to the improvement in traffic and earnings, as outlined in other articles herein. Some 71,000 miles of line are still in bankruptcy, but there were no substantial additions to the total during the year. That no reorganizations of any consequence were effected in 1936 is no reflection of the trend of earnings, but rather is ascribable to the complexities of procedure under the amended bankruptcy act, and the belief of some parties at interest that some of its provisions do not accord justice to them, and which they assert are of doubtful constitutionality. Coupled with this has been the natural desire of junior security holders to postpone reorganizations until traffic returns more nearly to normal, restoring perhaps in some measure the earning power of their equities.

The fact that no lines of any size emerged from control by the courts during the year, however, is no gage of reorganization activity. Plans for recasting the financial structure of many of the properties have been drawn up by the managements in accordance with the law and are in process of discussion—leaving little doubt that the coming year will see a considerable degree of progress in this direction. Of the plans so far presented, several have met criticism of creditors to the effect that undue consideration was being shown to equity holders.

Market Prices Show Improvement

Market prices for railway stocks, as reflected in *Railway Age* averages of 20 representative issues, showed a decided trend for the better—but there was nothing spectacular about it. Opening the year at an average of approximately 44, the index rose to 50 at the last of February and receded to slightly less than 45 by the end of April. Thereafter a steady climb set in, running over 55 in August. After a short and slight recession, the increase was resumed, reaching approximately 60 in mid-October. Since that time there has been a decided recession, bringing the average down to 51.5 as the year drew to a close—the decline being particularly marked when, on December 18, the Interstate Commerce Commission refused to grant an extension

Chart A—Average Prices of Twenty Stocks and Twenty Bonds, with Dividends of Twenty Railroads on Same Relative Scale

1936 Dividends Estimated

of the emergency surcharges on freight traffic. The average thus showed a net improvement of some 7½ points, or 17 per cent during the year.

The Dow Jones index of representative railway stock prices, while it showed the same trends as our index, reflected somewhat larger net gains during the year—an increase in fact which, in percentages, was slightly greater than the gain in its average of industrial stocks.

The *Railway Age* average of the prices of 20 representative bonds moved along with the stock price average, although the range was not so wide. As with stocks, the high point of the year was reached in mid-

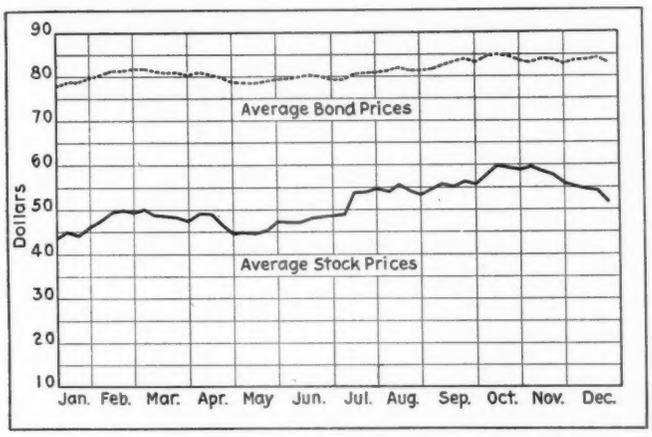


Chart B—Fluctuations in Average Prices of Twenty Leading Railroad Stocks and Twenty Bonds in 1936

October, with a recession since that time which, however, is much less marked with bonds than with stocks. The trend of stock and bond prices over the last eleven years, and during 1936, respectively, are shown graphically in Charts A and B. Chart A, it will be noted also, shows also on the same relative scale dividends by the companies whose stocks make up the stock price average. A sharp increase will be noted in dividends which, it may well be doubted, would have been so marked had the number of companies included been greater.

Table I—Comparison of Dividends and Taxes, 1911 to 1935

Year Ended June 30	Dividends*	Proportion of Net Income Paid in Dividends	Taxes*
1911	$397,068,724	81	$98,626,848
1912	339,964,855	85	109,445,407
1913	322,300,406	66	118,386,859
1914	376,098,785	108	135,572,579
1915	259,809,520	82	133,276,330
1916	281,936,371	47	145,517,034
Year Ended December 31			
1916	306,176,937	47	157,113,372
1917	320,395,779	53	213,920,095
1918	275,336,547	71	223,175,379
1919	278,516,908	63	232,601,396
1920	271,731,669	63	272,061,453
1921	298,511,328	95	275,875,990
1922	271,573,751	73	301,034,923
1923	296,127,048	53	331,915,459
1924	320,429,767	57	340,336,686
1925	342,020,885	49	358,516,046
1926	399,243,963	49	388,922,856
1927	411,581,093	61	376,110,250
1928	430,677,138	55	389,432,415
1929	490,125,673	55	396,682,634
1930	497,024,912	95	348,553,953
1931	330,150,873	245	303,528,099
1932	92,354,322	def.	275,135,399
1933	95,725,783	def.	249,623,190
1934	133,418,896	def.	239,624,802
1935	126,282,306	1675	236,944,985

* Not including switching and terminal companies.

Paying Back the R.F.C.

The railroads have during the year made great strides in repaying loans from the government. These loans fall into two categories—those made by the Public Works Administration and those made by the Reconstruction Finance Corporation. The latter govern-

Table II—R.F.C. Loans and Repayments As of December 18, 1936

	Total Disbursed	Total Repaid	Repaid in 1936
Aberdeen & Rockfish	$127,000	$22,500	$4,500
Alabama, Tennessee & Northern	275,000	.....	.....
Alton	2,500,000	605,367	.....
Ann Arbor (Receivers)	634,757	234,757	200,000
Ashley, Drew & Northern	400,000	150,000	100,000
Baltimore & Ohio	82,110,400	12,150,477	5,577
*Birmingham & Southeastern	41,300	41,300	36,000
Boston & Maine	7,569,437	.....	.....
Buffalo, Union-Carolina	.....	.....	.....
Carlton & Coast	535,800	45,503	36,426
Central of Georgia	3,124,319	230,028	.....
*Central of New Jersey	464,298	464,298	.....
Charles City Western	140,000	.....	.....
Chicago & Eastern Illinois	5,916,500	155,632	.....
Chicago & North Western	46,588,133	4,338,000	400,000
Chicago Great Western	1,439,000	838	.....
Chicago, Milwaukee, St. Paul & Pacific	14,420,000	538	.....
Chicago, North Shore & Milwaukee	1,150,000	.....	.....
Chicago, Rock Island & Pacific	13,718,700	.....	.....
*Cincinnati Union Terminal Co.	8,300,000	8,300,000	.....
Colorado & Southern	28,925,300	1,481,000	481,000
Columbus & Greenville	.....	.....	.....
*Copper Range	53,500	53,500	.....
Denver & Rio Grande Western	8,081,000	500,000	.....
Denver & Salt Lake Western	3,182,150	71,300	.....
Erie	16,582,000	4,690	.....
Eureka-Nevada	.....	.....	.....
Florida East Coast (Receivers)	627,075	.....	.....
Fort Smith & Western (Receivers)	227,434	.....	.....
Fort Worth & Denver City	8,176,000	.....	.....
Fredericksburg & Northern	.....	.....	.....
Gainesville Midland (Receivers)	.....	.....	.....
Galveston, Houston & Henderson	1,061,000	.....	.....
Georgia & Florida (Receivers)	354,721	.....	.....
*Great Northern	6,000,000	6,000,000	.....
Greene County	13,915	7,915	4,000
*Gulf, Mobile & Northern	520,000	520,000	.....
Illinois Central	25,290,000	95,000	10,000
Lehigh Valley	8,500,000	3,500,000	3,500,000
*Litchfield & Madison	800,000	800,000	.....
*Maine Central	2,550,000	2,550,000	2,428,897
Maryland & Pennsylvania	197,000	50,000	50,000
Meridian & Bigbee River (Trustee)	985,000	.....	.....
Minneapolis, St. Paul & S.S. Marie	6,843,082	621,153	49,762
Mississippi Export	100,000	62,500	37,500
*Missouri-Kansas-Texas	2,300,000	2,300,000	2,294,149
Missouri Pacific	23,134,800	.....	.....
Missouri Southern	99,200	200	.....
*Mobile & Ohio	785,000	785,000	.....
Mobile & Ohio (Receivers)	1,070,599	220,599	27,599
Murfreesboro-Nashville	25,000	.....	.....
*New York Central	27,499,000	27,499,000	11,899,000
*New York, Chicago & St. Louis	18,200,000	18,200,000	15,511,587
New York, New Haven & Hartf.	7,699,779	34,200	20,476
*Pennsylvania	28,900,000	28,900,000	.....
*Pere Marquette	3,000,000	3,000,000	2,000,000
Pioneer & Fayette	17,000	6,000	4,000
Pittsburgh & West Virginia	4,475,207	750,000	750,000
Puget Sound & Cascade	300,000	202,380	.....
St. Louis-San Francisco	7,995,175	2,805,175	202,380
*St. Louis-Southwestern	18,672,250	18,672,250	17,882,250
Salt Lake & Utah (Receivers)	200,000	.....	.....
Sand Springs	162,600	4,600	4,600
*Southern Pacific	22,000,000	22,000,000	22,000,000
Southern	19,610,000	275,796	18,436
Sumpter Valley	100,000	67,770	35,870
Tennessee Central	147,700	.....	.....
Texas, Oklahoma & Eastern	.....	.....	.....
*Texas & Pacific	700,000	700,000	.....
*Texas South-Eastern	30,000	30,000	.....
*Tuckerton	39,000	39,000	38,919
Wabash (Receivers)	15,731,583	.....	.....
Western Pacific	4,366,000	1,403,000	.....
Wichita Falls & Southern	400,000	75,000	50,000
*Wrightsville & Tennille	22,525	22,525	.....
Totals	$516,206,239	$171,048,791	$80,082,928

* Repaid in full.

Table III—Status of P.W.A. Loans Sold to R.F.C.

As of December 18, 1936

Par amount of railroad securities purchased from PWA by RFC		$195,645,500.00
Par amount sold to public	$105,613,000.00*	
Repurchases† and maturity pay- by railroads	37,999,000.00	143,612,000.00
On Hand		$52,033,500.00

*At a net premium of $4,407,767.35.
† At a premium of $282,392,50.

Table IV—Major Bond and Note Issues of 1936

Issue	Maturity	Amount	Int. Rate %	Sold to Banker Price	Sold to Banker % Cost	Offered to Public Price	Offered to Public % Yield	Banker
Cambria & Indiana, ser. notes	1937-40	400,000	1.86avg	100	....	.....	....	Drexel & Co.
Chesapeake & Ohio, rfd. & imp.	1996	29,500,000	3½	97½	3.59	99½	3.52	Morgan, Stanley & Co., et al.
Chesapeake & Ohio, rfd. & imp.	1996	40,362,000	3½	97½	3.59	99½	....	Morgan, Stanley & Co., et al.
Chesapeake & Ohio, ser. notes	1936-46	15,300,000	⅝–2⅞	99	....	100	⅝–2⅞	Morgan, Stanley & Co., et al.
Chicago & Illinois Midland, 1st mtg.	1956	5,500,000	4½	96¾	4¾	99½	....	Halsey, Stuart & Co., et al.
Chicago & Western Indiana, 1st rfd.	1962	22,727,000	4½	100	....	102	....	Morgan, Stanley & Co., et al.
Chicago Union Sta., 1st mtg.	1963	44,000,000	3¾	102¼	3.62	104¼	3.5	Kuhn, Loeb & Co.
Chicago Union Sta., guar.	1951	7,000,000	3½	100¼	3.48	102	....	Kuhn, Loeb & Co.
Cincinnati Union Terminal, 1st mtg.	1971	24,000,000	3¼	100½	3.47	102½	....	Morgan, Stanley & Co. & Kuhn, L. & Co.
Great Northern, sec. ser.	1936-44	4,935,000	4	104.527†	....	.....	0.35-3.25	Halsey, Stuart & Co., et al.
Great Northern, sec. ser.	1946	100,000,000	4	*	....	*	....	*
Indianapolis Union, rfd. & imp.	1986	4,714,000	3½	102.33	3.401	103⅝	3.35	Hallgarten & Co., et al.
Lehigh & New England, ser. notes	1936-43	1,000,000	¾–3	100	....	.....	....	Drexel & Co.
Long Island, rfd.	1949	10,000,000	4	103¾	....	105½	3.44	Kuhn, Loeb & Co.
Louisville & Nashville, 1st & rfd.	2003	9,292,000	4	98	....	100	4	Morgan, Stanley & Co.
Louisville & Nashville, 1st & rfd.	2003	26,000,000	3¾	96	....	98	....	Morgan, Stanley & Co.
Maine Central, 1st mtg. & coll.	1945	12,424,000	4	98⅜‡	4.2	98¼	3.84	Kidder, Peabody & Co., et al.
Maine Central, gen. mtg.	1960	10,000,000	4½	Taken by bondholders in partial payment of a maturity.				
Minnesota Transfer, 1st mtg.	1956	2,000,000	3¾	103.8	3.485	.....	3.35	Lazard Freres & Co., et al.
New York Central, sec. skg. fund	1946	40,000,000	3¾	96¼	....	98	....	Morgan, Stanley & Co., et al.
New York Central, ser. sec.	....	15,000,000	1½-2.6	99¾	....	.....	....	.....
New York Central, B. & A. imp.	....	500,000	4¼	99	....	.....	....	Whiting, Weeks & Knowles
New York, Chicago & St. Louis, col. trst.	1946	16,000,000	4	98	4¼	100	....	Edw. B. Smith & Co., et al.
Pennsylvania, sec. ser.	1937-64	30,800,000	4	103.547†	....	.....	0.75-3.88	Halsey, Stuart & Co., et al.
Pennsylvania, gen. mtg.	1970	40,000,000	3¾	96¼	3.95	98¼	3.84	Kuhn, Loeb & Co.
Pennsylvania, gen. mtg.	1970	20,000,000	3¾	99½	3.78	.....	3.67	Kuhn, Loeb & Co.
Piedmont & Northern, 1st mtg.	1966	6,250,000	3¾	97½	....	100	3¾	Blyth & Co., et al.
Piedmont & Northern, deb.	1937-46	475,000	1½-3½	....	....	100	....	R. S. Dickson & Co.
Reading, No. Pa. 1st mtg.	1953	1,500,000	3½	100	3½	Extended maturity, sold to an insurance co. by the R.R.		
Southern Pacific, sec.	1946	60,000,000	3¾	97	4⅛	98¾	3.9	Kuhn, Loeb & Co.
Union Pacific, debentures	1971	26,835,000	3½	97	3,652	99	3.55	Kuhn, Loeb & Co.
Union Pacific, deb.	1970	20,000,000	3½	97½	3.62	99½	....	Kuhn, Loeb & Co.
Virginian, 1st lien & rfd.	1966	60,344,000	3¾	100¼	....	102¼	....	Brown, Harriman & Co., et al.

* Offered to stockholders, bondholders and public with R.F.C. agreeing to take those not sold.
† Price of R.F.C. to banker.
‡ Bonds offered first at par to holders of maturing issue, residue ($8,718,500) taken by banker at this price.

Major Issues of Equipment Trust Certificates

Road	Maturity	Amount	Int. Rate %	Sold to Banker Price	Sold to Banker % Cost	Offered to Public Price	Offered to Public % Yield	Offered by
Bessemer & Lake Erie	1936–51	7,000,000	2½	Sold at Par to U. S. Steel Corp.				
Birmingham Southern	1937–46	900,000	3½	106.137	....	.....	½–2¾	L. M. Marks & Co.
Central of Georgia	1937–52	400,000	4	100	....	.....	.....	Lane, Space & Co.
Chesapeake & Ohio	1937–46	9,280,000	2¼	101.201	2.018	.....	½–2.4	Field, Glore & Co., et al.
Chicago & Eastern Illinois	1937–52	1,080,000	3½	Sold to General American Transportation Corp. at par.				
Chicago, Burl. & Quincy.	1937–46	3,950,000	2½	102.729	1.95	.....	.....	Harris Trust & Savings Bank
Chicago, Rock I. & Pacific	1937–47	2,400,000	3½	.....	....	.....	0.8–3.7	Lehman Bros., et al.
Del., Lackawanna & West.	1936–49	3,619,000	4	106.097†	....	.....	0.375–3.2	Brown, Harriman & Co., et al.
Del., Lackawanna & West.	1936–49	1,033,000	4	105.625†	....	Sold to Marine Midland Trust Co.		
Gulf, Mobile & Northern.	1937–46	1,440,000	2¼	100.17	....	.....	½–2½	Brown, Harriman & Co.
Illinois Central	1937–44	13,900,000	4	103.5‡	....	.....	½–3	Salomon Bros. & Hutzler, et al.
Kansas City Southern	1938–43	1,278,000	3	.....	....	.....	0.4–1.8	Brown, Harriman & Co., et al.
Lehigh & New England	1937–51	410,000	2¾	103.035	2.32	.....	.....	Lazard, Freres & Co.
Missouri Pacific	1937–46	3,490,000	3½	Sold to Prudential Insurance Company at 102.54.				
N. Y., Chicago & St. L.	1937–51	1,410,000	3	100.659	....	.....	¾–3¼	Estabrook & Co., et al.
N. Y., Chicago & St. L.	1937–49	4,624,000	4	104‡	....	.....	½–3.6	Stroud & Co.
N. Y., N. H. & Hartford.	1937–51	3,075,000	3	100.273	2.96	.....	¾–3¼	Whiting, Weeks & Knowles, et al.
Northern Pacific	1937–46	3,000,000	2¼	101.259	2	.....	½–2.3	Salomon Bros. & Hutzler, et al.
Pennsylvania	1936–50	18,420,000	2¾	100.2813	2.71	.....	.....	First Boston Corp., et al.
Pennsylvania	1936–54	17,460,000	4	107.202‡	....	.....	.....	Salomon Bros. & Hutzler
Pere Marquette	1937–46	1,260,000	2½	102.03	....	.....	½–2.45	Hallgarten & Co., et al.
Pittsburgh & W. Va.	1937–46	2,000,000	3½	97.75	3.97	.....	1–4	A. G. Becker & Co.
Pittsburgh & W. Va.	1937–46	350,000	2½	98.08	2.92	.....	1–3	Stroud & Co.
Southern Pacific	1937–51	9,150,000	2¼	99.527	2.3	.....	½–2½	Halsey, Stuart & Co., et al.
Union	1937–51	2,700,000	2½	Sold at par to U. S. Steel Corp.				
Wheeling & Lake Erie	1937–46	1,400,000	2¼	101.09	2.04	.....	.....	Union Trust Co. (Pittsburgh)
Wheeling & Lake Erie	1936–41	750,000	2¼	103.411	1.1	.....	.....	Northern Trust Co. (Chi.)
Wisconsin Central	1937–46	350,000	3½	100	....	.....	.....	Thrall, West & Co., et al.

† Originally sold to R.F.C. at par, repurchased by R.R. at 104.
‡ Sold by R.F.C. to bankers at this price.

Table V—Railway Securities Sold to Public in 1916 and 1920 to 1936

Year	Bonds	Notes	Stock	Total R.R. financing	Total all financing	Per Cent R.R. to total
1916	$229,000,000	$126,000,000	$16,000,000	$371,000,000	$1,864,000,000	19.9
1920	194,583,000	193,840,000	3,737,000	392,160,000	3,324,922,000	12.1
1921	455,125,000	202,928,300	27,222,500	685,275,800	2,780,874,000	24.6
1922	299,025,800	288,936,500	27,068,100	615,030,400	3,200,176,000	19.2
1923	165,956,000	354,720,500	59,140,850	579,817,350	3,602,704,000	16.0
1924	620,347,000	351,276,200	11,000,000	982,623,200	4,185,590,000	23.5
1925	374,020,500	151,753,740	30,934,430	556,708,670	5,234,992,000	10.6
1926	241,954,000	172,477,000	41,577,200	456,008,200	5,746,354,000	7.9
1927	686,939,500	89,184,600	210,596,900	986,721,000	7,830,641,000	12.6
1928	525,719,000	79,911,000	187,369,100	792,999,100	8,473,880,000	9.4
1929	418,984,000	180,322,000	275,269,240	874,575,240	11,007,170,000	7.9
1930	800,694,000	142,168,000	63,805,600	1,006,667,600	5,920,498,000	17.0
1931	453,824,000	105,209,000	.....	559,033,000	2,730,082,000	20.5
1932	11,827,000	13,125,000	.....	24,952,000	684,806,000	3.6
1933	12,000,000	.....	.....	12,000,000	335,812,000	3.6
1934	172,074,000	71,068,000	.....	243,142,000	618,627,000	39.3
1935	107,746,000	57,372,000	.....	165,118,000	2,190,093,550	7.6
1936*	582,254,000	51,772,000	.....	634,026,000	3,530,741,924	18.0

* 11 Months Total as compiled by Dow Jones & Co.

ment body acquired from the former all its railroad obligations, a large part of which were equipment trust certificates, and these latter the R.F.C. has been selling to private investment houses—realizing in most cases a decided profit on the transaction. In all, of over $195,000,000 of P.W.A. loans, only $52,000,000 remain in the hands of the R.F.C., and the government has realized a profit of almost $5,000,000 on the transaction, in addition to its interest revenues.

Of loans by the R.F.C. proper—$516,000,000 has been disbursed and of this $171,000,000 has been repaid—$80,000,000 of these repayments having been made in 1936. In all the government disbursed some 717 millions to the railroads and, of this total, 319 millions have been recovered. Twenty roads have repaid the R.F.C. in full and loans to 48 roads remain outstanding, but 30 of which are Class I carriers. Loans totaling 117 millions are in default to the R.F.C. for principal and interest. The status of government is shown in detail in accompanying tables.

Dividends on the Mend

While but a handful of companies remain which pay dividends on their common stock, nevertheless the disbursements by a number of them were sharply increased during the year (partly to avoid penalty taxation on undistributed corporate earnings under the new tax law). Several companies resumed dividends—notably on preferred issues and in two or three outstanding instances heavy interest arrearages on cumulative stocks were made up entirely or in large part. Typical of dividend changes during the year were the following:

The Alabama Great Southern disbursed $1.50 on its ordinary stock ($50 par) in July, the first such payment since $2 was paid on it in 1934. Another $1.50 disbursement, plus $2 extra, was made in December.

The Atlantic Coast Line in November declared a $1 dividend on its common stock, the first disbursement since January, 1932, when $2 was paid.

The Chesapeake & Ohio paid an extra dividend of $1 in cash and $2 in new preference stock on its $25-par common.

The Chicago, Burlington & Quincy in December declared a dividend of $4 on its common stock. In 1935 the disbursement was $2 per share.

The Cincinnati, New Orleans & Texas Pacific in November declared an extra dividend of $23 on its common stock, in addition to an extra of $2.50 in June, at which time the regular semi-annual dividend was raised from $4 to $5.

In November Kansas City Southern directors declared a dividend of $1 on its preferred stock, the first payment since April, 1933, when 50 cents was paid on this issue.

The Louisville & Nashville in January declared a dividend of $2 on the common stock, the preceding payment in August, 1935, having been $1. In July a further $2.50 was declared. In December an extra disbursement of $1.50 was made.

The Norfolk & Western paid an extra dividend of $5 on its common stock in addition to an earlier extra disbursement of $2, which latter, but not the former, it also paid in the preceding year.

The Pensylvania during the year made two disbursements of $1 on its $50-par stock, or four times as much as in the preceding year.

Pere Marquette directors in November declared a dividend of $20 on the accumulation on its prior preference stock, the last previous disbursement ($1.25) having been made in 1931.

Directors of the Pittsburgh & Lake Erie in December declared a dividend of $1.50 on its stock, par $50. Heretofore, since 1932, the semi-annual disbursement has been $1.25.

The Texas & Pacific in August resumed dividends on its preferred stock, $2.50 being declared at that time—the first such disbursement since 1932, when $1.25 was paid.

The Virginian in June paid a dividend of $2.50 on its common stock, the last previous disbursement having been $2, in December, 1935.

In November the directors of the Western Maryland declared an initial dividend of $7 per share on its first preferred stock.

The Wheeling & Lake Erie in October declared initial quarterly dividends of $1 on its 4 per cent prior lien and $1.375 on its 5½ per cent preferred stock. In June arrearages of interest ($35) on the prior lien stock were paid off, and the interest rate was reduced from 7 per cent to 4 per cent at that time, plus a cash payment of $7.50 per share.

New Security Issues

There was a marked revival in the sale of securities which, except for equipment issues, were almost if not entirely for meeting maturities, or for the refunding of existing obligations at reduced rates of interest. The Dow, Jones & Co. total of public offerings of railroad securities for the first 11 months of the year was 634 millions, compared with 165 millions for the entire year 1935, and the highest total for any year since 1930. Most

Table VI—Mileage in the Hands of Receivers or Trustees

(Figures to 1935, Inclusive, from I. C. C. Statistics for Year Ended December 31, 1935. Figures for 1936 Compiled by *Railway Age*.)

Year ended	Miles of road operated by receivers or trustees at close of year	Net change during year in miles of road operated	No. of roads in charge of receivers or trustees at close of year
June 30, 1894	40,819	.....	192
1895	37,856	−2,963	169
1896	30,476	−7,380	151
1897	18,862	−11,614	128
1898	12,745	−6,117	94
1899	9,853	−2,892	71
1900	4,178	−5,675	52
1901	2,497	−1,681	45
1902	1,475	−1,022	27
1903	1,185	−290	27
1904	1,323	+138	28
1905	796	−527	26
1906	3,971	+3,175	34
1907	3,926	−45	29
1908	9,529	+5,603	52
1909	10,530	+1,001	44
1910	5,257	−5,273	39
1911	4,593	−664	39
1912	9,786	+5,193	44
1913	16,286	+6,500	49
1914	18,608	+2,322	68
1915	30,223	+11,615	85
1916	37,353	+7,130	94
Dec. 31, 1916	34,804	−2,550*	80
1917	17,376	−17,428	82
1918	19,208	+1,832	74
1919	16,590	−2,618	65
1920	16,290	−300	61
1921	13,512	−2,778	68
1922	15,259	+1,747	64
1923	12,623	−2,636	64
1924	8,105	−4,518	61
1925	18,687	+10,582	53
1926	17,632	−1,055	45
1927	16,752	−880	40
1928	5,256	−11,496	33
1929	5,703	+447	29
1930	9,486	+3,783	30
1931	12,970	+3,484	45
1932	22,545	+9,575	55
1933	41,698	+19,153	78
1934	42,168	+470	80
1935	68,345	+26,177	87
1936	71,134	+2,789	90

* Represents decrease for six months.

Table VII—Receiverships and Trusteeships Established in 1936

Name of Road	Mileage	Funded Debt Outstanding	Capital Stock Outstanding
Boonville, St. Louis & Southern	*	$250,000	$250,000
Hartford & Connecticut Western	†	none	2,967,000
Narragansett Pier	8	none	133,800
Old Colony	†	14,348,000	25,077,600
Total four companies	8	$14,598,000	$28,428,400

*Leased to Missouri Pacific.
†Leased to New York, New Haven & Hartford.

Table VIII—Foreclosure Sales in 1936

Name of Road	Mileage	Funded Debt Outstanding	Capital Stock Outstanding
Chesapeake Beach	3	$998,000	$1,000,000
Pacific & Idaho Northern	90	1,983,000	2,929,800
Tuckerton	29	44,919	552,242
Total three companies	122	$3,025,919	$4,482,042

Table IX—Railroads in the Hands of Receivers or Trustees on December 31, 1936

(For explanation of data bearing symbols see column headed "Remarks")

Road	Mileage operated	Mileage owned	Date of receivership or trusteeship	Funded debt outstanding	Capital stock outstanding	Total old company securities	Remarks
Akron, Canton & Youngstown	171	19	Apr. 3, 1933	$3,550,000	$1,500,000	$5,459,000	
Northern Ohio	....	152	Apr. 3, 1933	3,300,000*	4,230,000	7,530,000	*Includes $800,000 General Mortgage bonds held by Akron, Canton and Youngstown.
Alabama, Tennessee & Northern	218	215	Dec. 14, 1934	3,632,289	3,916,560	7,700,349	
Apalachicola Northern	99	99	May 28, 1932	2,000,000	1,000,000	3,000,000	
California & Oregon Coast	15	15	Feb. 19, 1925	528,199	350,000	903,199	
Cape Girardeau Northern	....	67	Apr. 14, 1914	1,146,000	110,000	1,431,900	Line has been abandoned, and receiver is disposing of its property.
Central of Georgia	1927	1401	Dec. 19, 1932	53,722,000	20,000,000	76,448,000	
Chicago & Eastern Illinois	931	813	Sept. 15, 1933	33,587,036	45,891,400	80,275,436	
Chicago & North Western	8355	8350	June 28, 1935	305,895,500*	180,835,100	505,687,600	*Includes $18,871,000 funded debt matured unpaid.
Chicago, Attica & Southern	155	140	Aug. 4, 1931	441,200	2,294,452*	2,735,652	*Capital stock represented by 10,000 shares of no par value.
Chicago Great Western	1513	1003	Mar. 1, 1935	36,044,000	92,282,900	133,613,091	
Chicago, Indianapolis & Louisville	572	542	Dec. 30, 1933	26,071,000	15,488,300	42,188,793	
Chicago, Milwaukee, St. Paul & Pacific	11,126	10,050	June 29, 1935	438,245,789	224,452,017*	689,116,481‡	*Capital stock includes 1,174,060 shares common of no par value. ‡Includes $4,881,600 equipment trust certificates matured unpaid.
Chicago, Rock Island & Pacific	7534	5283	June 7, 1933	253,779,000	128,892,512	413,554,512	
Chicago, Rock Island & Gulf	627	635	Oct. 31, 1933	16,583,000	637,000	17,220,000	
Choctaw, Oklahoma & Gulf	....	910	Oct. 31, 1933	8,936,000	15,827,500	24,763,500	
Rock Island & Dardanelle	....	14	Oct. 31, 1933	100,000	100,000	200,000	
Rock Island, Arkansas & Louisiana	....	376	Aug. 31, 1933	15,315,600	1,768,000	17,083,600	
Rock Island, Memphis Terminal	....	*	Oct. 31, 1933	1,300,000	1,000	1,301,000	*Mileage owned consists of yard tracks and sidings.
Rock Island, Omaha Terminal	....	*	Oct. 31, 1933	906,000	10,000	916,000	*Mileage owned consists of yard tracks and sidings.
Rock Island, Stuttgart & Southern	....	21	Oct. 31, 1933	180,000	300,000	480,000	
St. Paul & Kansas City Short Line	....	417	Aug. 31, 1933	27,812,390	50,000	27,862,390	
Chicago, Springfield & St. Louis	87	79	Jan. 24, 1930	500,000	204,960	704,960	This road was sold at foreclosure sale on June 25, 1931, but the receiver is still operating the property.
Colorado—Kansas	23	22	July 1, 1931	None	None	.....	Obligations and indebtedness pursuant to trustee's sale of foreclosure and receivership, $25,170.57. Following trustee's foreclosure sale on Sept. 30, 1932, receiver was discharged and reappointed during the redemption period for the bondholders.
Copper Range	152	131	Mar. 26, 1935	2,100,000	2,000,000	4,100,000	
Denver & Rio Grande Western	2576	2402	Nov. 1, 1935	127,916,000	78,887,539	211,758,539	
Denver & Salt Lake Western	....	38	Nov. 1, 1935	None	3,631,000	3,631,000	
Florida East Coast	685	804*	Sept. 1, 1931	57,000,000	37,500,000	98,139,075‡	*Includes 125 miles of main line between Florida City and Key West, abandonment of which has been authorized by the I.C.C., but actual abandonment has not yet been accomplished. ‡Includes $627,075 receiver's certificates issued nominally as collateral for an R.F.C. loan.
Fonda, Johnstown & Gloversville	66	62	Apr. 20, 1933	6,150,000	3,000,000	9,194,739	
Fort Smith & Western	250	197	June 1, 1931	5,244,000	1,248,000*	6,719,434	*Capital stock represented by 62,400 shares of no par value.
Gainesville Midland	74	72	Feb. 15, 1921	949,285	550,000	1,499,285	See *Railway Age*, Jan. 5, 1929, p. 67.
Georgia & Florida	409	364	Oct. 19, 1929	7,446,000	13,382,441*	21,865,441	*Capital stock includes 100,000 shares common of no par value.
Georgia, Southwestern & Gulf	36	....	Jan. 2, 1933	76,800	14,700	91,500	
Albany & Northern	....	35	Jan. 2, 1933	400,000	350,000	750,000	
Jacksonville & Havana	60*	42	Feb. 1, 1930	300,000	160,810	460,810	*Including trackage rights over C. B. & Q., between Jacksonville, Ill., and Waverly, 18 miles.
Kirby Lumber Company's Tram Roads	51	51	Jan. 25, 1934	Data not available.			
Louisiana & North West	99	93	Apr. 1, 1935	2,169,000	2,300,000	4,469,000	
Louisiana Southern	52	52	Aug. 2, 1933	1,000,000	100,000	1,100,000	
Meridian & Bigbee River	51	51	June 15, 1933	500,000	300,000	1,810,000	
Middleburgh & Schoharie	5	5	Feb. 1, 1935	18,000	88,500	106,500	
Minneapolis & St. Louis	1530	1431	July 26, 1923	43,366,051	25,792,600	70,737,013	
Missouri Pacific	7216*	6661*	July 1, 1933	348,637,500	154,639,600	516,479,100	*Estimated.
Boonville, St. Louis & Southern	0.2	0.2	Sept. 18, 1936	250,000	250,000	500,000	
Missouri-Illinois	206	190	July 1, 1933	2,737,500	2,250,000	4,987,500	
Missouri-Pacific R.R. Corp. in Nebr.	359	349	July 1, 1933	12,735,500	4,000,000	16,735,500	
New Orleans, Texas & Mexico	191	173	July 1, 1933	40,615,900	15,000,000	55,615,900	
Beaumont, Sour Lake & Western	146	84	July 1, 1933	2,057,825	85,000	2,142,825	
Houston North Shore	....	27	July 1, 1933	850,000	100,000	950,000	
International-Great Northern	1155	1101	July 1, 1933	45,750,000	7,500,000	54,464,000	
St. Louis, Brownsville & Mexico	598	552	July 1, 1933	12,913,342	500,000	14,333,342	
San Antonio, Uvalde & Gulf	317	314	July 1, 1933	4,413,000	280,000	4,693,000	
Mobile & Ohio	1202	913	June 3, 1932	31,022,740	6,007,200	40,271,940*	*Includes $850,000 receiver's certificates which are security for an R.F.C. loan.
Narragansett Pier	8	8	Jan. 31, 1936	None	133,800	133,800	
Nevada Copper Belt	30	41	Apr. 2, 1925	622,000	No value	622,000	
New York, New Haven & Hartford	2062	1259	Oct. 23, 1935	256,754,628	206,155,300	476,293,928	
Hartford & Connecticut Western	....	124	July 31, 1936	None	2,967,000	2,967,000	
Old Colony	....	530	June 3, 1936	14,348,000	25,077,600	39,425,600	
Norfolk Southern	835	789	July 28, 1932	15,401,000	16,000,000	32,195,000	
Pittsburg, Shawmut & Northern	191	156	Aug. 1, 1905	14,655,600	15,000,000	31,700,020	
Pittsburgh & Susquehanna	....	18	Apr. 22, 1931	300,000	300,000	600,000	The I.C.C. has authorized abandonment of the entire line.
Reader	22	22	May 28, 1935	None	160,600	160,600	
Rio Grande Southern	174	174	Dec. 16, 1929	4,509,000	4,510,000	9,065,000	
St. Louis-San Francisco	4928	4763	Nov. 1, 1932	268,098,767	114,589,791	395,196,558	
St. Louis Southwestern	1054	750	Dec. 12, 1935	32,233,000*	37,079,700	75,225,700	*Second mortgage income bond held by St. L. S. W.—funded debt statement herein therefore overstates liability by $6,957,500.
Central Arkansas & Eastern	....	43	Dec. 17, 1935	1,085,000	150,000*	1,235,000	*Intercompany item.
St. Louis Southwestern of Texas	696	661	Dec. 12, 1935	15,472,500	2,750,000*	18,222,500	*Intercompany item.
Stephenville North & South Texas	....	33	Dec. 17, 1935	2,423,000	138,300*	2,561,300	*Intercompany item.
Santa Fe, San Juan & Northern	....	32	Oct. 14, 1931	.....	500,057	.....	Other information not available.
Savannah & Atlanta	145	142	Mar. 4, 1921	3,365,870	2,250,000	6,115,870	

Table IX (Continued)—Railroads in the Hands of Receivers or Trustees on December 31, 1936

Road	Mileage operated	Mileage owned	Date of receivership or trusteeship	Funded debt outstanding	Capital stock outstanding	Total old company securities	Remarks
Seaboard Air Line	4308	3329*	Dec. 23, 1930	151,738,740†	85,110,662	267,661,946‡	*Includes 8.50 miles owned but not operated. †Exclusive of pledged securities but inclusive of $30,597,402 matured funded debt, for the payment of which no provision has been made. ‡Inclusive of $1,926,100 matured equipment obligations which are authorized to be exchanged for receiver's certificates under the Seaboard's 1935 Refunding Plan.
Chesterfield & Lancaster	33	32	Apr. 14, 1931	253,000*	500,000	753,000	*Inclusive of $67,000 principal amount of second mortgage 6% bonds matured Jan. 15, 1918.
East & West Coast	side track		Feb. 2, 1931	624,333	250,000	890,333	
Florida Western & Northern	....	233	Feb. 2, 1931	14,999,000	5,000	15,169,000	
Georgia, Florida & Alabama‡	....	192	Nov. 7, 1931	1,750,000	2,010,678*	4,237,678	*Capital stock includes 10,000 shares common of no par value. ‡Operated for Georgia, Florida & Alabama receivers by Seaboard Air Line receivers under court orders.
Raleigh & Charleston	20	20	May 1, 1931	550,000	574,500	1,124,500	
Seaboard-All Florida	....	184	Feb. 2, 1931	17,881,667	2,500	18,012,167	
Shelby Northwestern	22	22	Sept. 15, 1932	300,000	25,000	325,000	
Sierra Ry. Co. of California	119	59	May 5, 1932	1,747,000	3,248,000	4,995,000	
Spokane International	164	139	Aug. 28, 1933	4,200,000	4,200,000	8,400,000	
Coeur D'Alene & Pend D'Oreille	....	21	Aug. 30, 1933	544,000	544,000	1,088,000	
Tallulah Falls	57	57	June 24, 1923	1,519,000	323,400	1,842,400	
Tonopah & Goldfield	102	93	July 20, 1932	None	1,051,500	1,051,500	
Wabash	2447	1991*	Dec. 1, 1931	122,383,526	138,120,767	291,694,087‡	*Includes 6.83 miles owned but not operated. ‡Includes $15,731,583 receiver's certificates outstanding as collateral to R.F.C. for unpaid loans.
Ann Arbor	294	294	Dec. 4, 1931	9,164,541	7,250,000	16,814,541*	*Includes $400,000 receiver's certificates outstanding as collateral to R.F.C. for unpaid loans.
Waco, Beaumont, Trinity & Sabine	115	115	Feb. 8, 1930	330,000	1,113,000	1,469,202	
Western Pacific	1208	1152	Aug. 2, 1935	49,290,100	75,800,000	138,454,565	
Wichita Northwestern	99	99	Nov. 10, 1922	381,750	1,690,000	2,115,750	
Wilmington, Brunswick & Southern	35	35	Mar. 17, 1933	183,750	165,000	348,750	
Wisconsin Central	1119	1014	Dec. 2, 1932	44,423,000*	27,392,200	72,165,200	*Includes $7,500,000 funded debt matured unpaid.
Yreka Western	8	8	Sept. 16, 1935	None	7,500	27,500	

Table X—Summary of Railroad Receiverships and Foreclosure Sales, 1876 to 1936

	Roads Placed in Receivership			Summary of Foreclosure Sales				Roads Placed in Receivership			Summary of Foreclosure Sales		
Year	Number of roads	Miles	Bonds and stocks	Number of roads	Miles	Bonds and stocks	Year	Number of roads	Miles	Bonds and stocks	Number of roads	Miles	Bonds and stocks
1876...	42	6,662	$467,000,000	30	3,840	$217,848,000	1906...	6	204	$55,042,000	8	262	$10,400,000
1877...	38	3,637	220,294,000	54	3,875	198,984,000	1907...	7	317	13,585,000	6	114	13,777,000
1878...	27	2,320	92,385,000	48	3,906	311,631,000	1908...	24	8,009	596,359,000	3	138	2,547,000
1879...	12	1,102	39,367,000	65	4,909	243,288,000	1909...	5	859	78,095,000	12	2,629	250,033,000
1880...	13	885	140,265,000	31	3,775	263,882,000	1910...	7	735	51,427,500	17	1,100	93,660,109
1881...	5	110	3,742,000	29	2,617	137,923,000	1911...	5	2,606	210,606,882	13	1,386	40,741,543
1882...	12	912	39,074,000	16	867	65,426,000	1912...	13	3,784	182,112,497	12	661	25,910,990
1883...	11	1,990	108,470,000	18	1,354	47,100,000	1913...	17	9,020	477,780,820	6	1,159	86,163,850
1884...	37	11,038	714,755,000	15	710	23,504,000	1914...	22	4,222	199,571,446	9	1,470	83,189,500
1885...	44	8,836	385,460,000	22	3,156	278,394,000	1915...	12	20,143	1,070,808,628	11	3,914	285,258,782
1886...	13	1,799	70,346,000	45	7,687	374,109,000	1916...	9	4,439	208,159,689	26	8,355	703,444,855
1887...	9	1,046	90,318,000	31	5,478	328,181,000	1917...	19	2,486	61,169,962	20	10,963	557,846,348
1888...	22	3,270	186,814,000	19	1,596	64,555,000	1918...	8	3,519	242,090,800	11	763	24,735,187
1889...	22	3,803	99,664,000	25	2,930	137,815,000	1919...	7	244	11,886,779	8	459	15,479,587
1890...	26	2,963	105,007,000	29	3,825	182,495,000	1920...	10	541	21,620,150	7	380	7,676,200
1891...	26	2,159	84,479,000	21	3,223	169,069,000	1921...	14	1,744	63,872,113	11	4,173	306,123,942
1892...	36	10,508	357,692,000	28	1,922	95,898,000	1922...	12	4,330	329,114,860	15	6,151	299,491,646
1893...	74	29,340	1,781,046,000	25	1,613	79,924,000	1923...	10	2,218	87,913,581	8	637	14,622,900
1894...	38	7,025	395,791,000	42	5,643	318,999,000	1924...	11	920	30,223,372	14	3,992	269,251,082
1895...	31	4,089	369,075,000	52	12,831	761,791,000	1925...	6	11,368	680,422,080	6	638	9,965,000
1896...	34	5,441	275,597,000	58	13,730	1,150,377,000	1926...	6	88	2,821,400	12	12,852	626,662,708
1897...	18	1,537	92,909,000	42	6,675	517,680,000	1927...	6	924	45,236,674	5	142	4,254,000
1898...	18	2,069	138,701,000	47	6,054	252,910,000	1928...	1	19	529,000	4	209	6,393,250
1899...	10	1,019	52,285,000	32	4,294	267,534,000	1929...	3	634	30,981,391	5	562	20,715,065
1900...	16	1,165	78,234,000	24	3,477	190,374,000	1930...	4	4,752	277,323,994	2	1,048	124,668,500
1901...	4	73	1,627,000	17	1,139	85,808,000	1931...	19	5,195	432,151,526	2	102	993,860
1902...	5	278	5,835,000	20	693	39,788,000	1932...	13	11,817	626,577,314	8	394	8,575,178
1903...	9	229	18,823,000	13	555	15,885,000	1933...	18	21,222	1,229,678,183	2	298	16,133,000
1904...	8	744	36,069,000	13	524	28,266,000	1934...	1	81	460,000	2	40	1,598,600
1905...	10	3,593	176,321,000	6	679	20,307,000	1935...	16	29,018	2,182,979,167	5	436	9,146,800
							1936...	4	8	43,026,400	3	122	7,507,961

of the year's offerings of issues of bonds, notes and equipment trust certificates are listed in accompanying tables. These include some which were not publicly offered in the New York market, but which were sold directly, or were handled by local bankers, and the total, including such issues and others not tabulated, is well in excess of the Dow Jones total.

There were also two issues of stock during the year, of a rather unusual kind. The Bangor & Aroostook issued $3,828,000 of convertible 5 per cent preferred stock which it sold to redeem $3,480,000 of 7 per cent preferred at 110. The Chesapeake & Ohio issued $15,315,500 of non-cumulative 4 per cent preference stock which it distributed pro rata to its common stockholders as a stock dividend. Several companies issued preferred stock with changes in its provisions for similar stock previously outstanding, among them notably being the Wheeling & Lake Erie. In an unusual trans-

action, holders of $1,000,000 of defaulted equipment trust certificates of the Florida East Coast took possession of the equipment covered by the trust and sold it.

There was little change in the situation with regard to bankruptcies during the year. No company of major importance entered bankruptcy during the year, and no re-organizations of any important bankrupt companies were consummated during the year. The mileage in bankruptcy—approximately 71,000—thus stands about where it was at the end of 1935.

Equipment Prices

IN some cases, but not in all, Interstate Commerce Commission reports of decisions upon applications for permission to issue equipment trust certificates disclose the unit price to be paid for the equipment thus financed. It is from such public records that the data shown in the accompanying tables are compiled.

The figures available are probably too fragmentary to be acceptable as an accurate cross-section of the market for the reason that heavy ordering did not occur until relatively late in the year, and details of their financing consequently have not been presented to the Commission for approval. Moreover, of course, not all equipment is financed in this manner and, when it is not, price data do not become a matter of record. If sufficiently active buying continues during the coming year, adequate data, as a result, will become available to be fairly representative of a market of considerable economic importance.

Some Typical Locomotive Unit Costs

No.	Type	Service	Weight	Tractive Force	Unit Price
10	2-10-4	Freight	523,550	109,935†	$124,700
4	0-8-0	Switch	279,000	64,309	69,500
1	Oil-Elec.	Switch	143,500	530 hp.	56,500
1	Diesel-Elec.	Switch	250,000	900 hp.	95,000
1	115-Ton	Diesel-Elec.	230,000	900 hp.	85,000
3	4-8-4	Freight	454,600	80,700†	110,000
1	4-4-2	Psgr.	256,000	30,700	115,000
5	Diesel-Elec.	Switch	199,000	600 hp.	65,000
5	Diesel-Elec.	Switch	199,000	660 hp.	avg.
10	4-6-4	Psgr.	350,000	44,000	120,000
12	4-6-6-4	Freight	631,000	104,300	162,026
2	2-6-6-4	Freight	532,000	97,500	107,430
2	2-6-6-4	Freight	532,000	97,500	107,041
12	4-8-8-2	Freight	642,500	123,400	160,166
6	4-8-4	Psgr.	445,200	74,710†	133,547
5	0-10-2	Switch	404,360	108,034†	99,500
5	0-6-0	Switch	201,400	64,188†	62,000

† Tractive force including booster.

Some Freight Car Prices of Record

No.	Type	Capacity	Unit Price
1000	Hopper	180,000	$4,080
1000	Hopper	140,000	3,840
100	Box	100,000	2,800
25	Gondola	140,000	3,750
300	Hopper	100,000	2.122 / 2.137
200	Hopper	100,000	2,250
1800	Hopper	100,000	2,088
1200	Hopper	100,000	2,076
500	Hopper	100,000	2,015
500	Box	100,000	2,334
500	Box	100,000	2,338
500	Gondola	100,000	2,012
150	Gondola	100,000	2,014
100	Gondola	100,000	2,088
150	Auto (loaders)	100,000	3,336
500	Box	100,000	2,700
250	Hopper	110,000	2,000
500	Box	100,000	2,150
100	Flat	100,000	2,050
500	Auto	80,000	2,564
500	Auto	100,000	2,919
500	Hopper	100,000	1,927
25	Gondola	140,000	3,167
200	Gondola	100,000	2,085
50	Flat	100,000	1,912
2	Flat	200,000	7,755
500	Box	100,000	2,314
250	Stock	80,000	2,042
250	Flat	100,000	2,025
500	Gondola	100,000	2,717
400	Auto (loaders)	80,000	3,056
100	Furn.	80,000	3,118
1750	Box	100,000	2,568
500	Auto (loaders)	100,000	3,690
250	Auto (loaders)	100,000	3,409
100	Gondola	100,000	2,502
102	Flat	100,000	1,991
1000	Gondola	140,000	2,825
1000	Hopper	120,000	1,930
250	Box	100,000	2,800

Some Passenger Car Prices

No.	Class	Length Ft.	Length In.	Weight lb.	Unit Price
20	Coach	81	8⅞	95,200	$29,000
2	Exp. & Bar	81	11½	96,200	29,000
3	Parlor	81	8⅞	95,100	31,000
2	Dining	81	11½	102,500	37,000
5	Bagg.	75	3½	88,000	16,000
5	Mail & Exp.	75	3½	94,200	19,000
50	Coach	82	4½	100,000	39,839
20	Horse	83	6	162,000	24,205

Reserves of Equipment Approach Vanishing Point

(Continued from page 27)

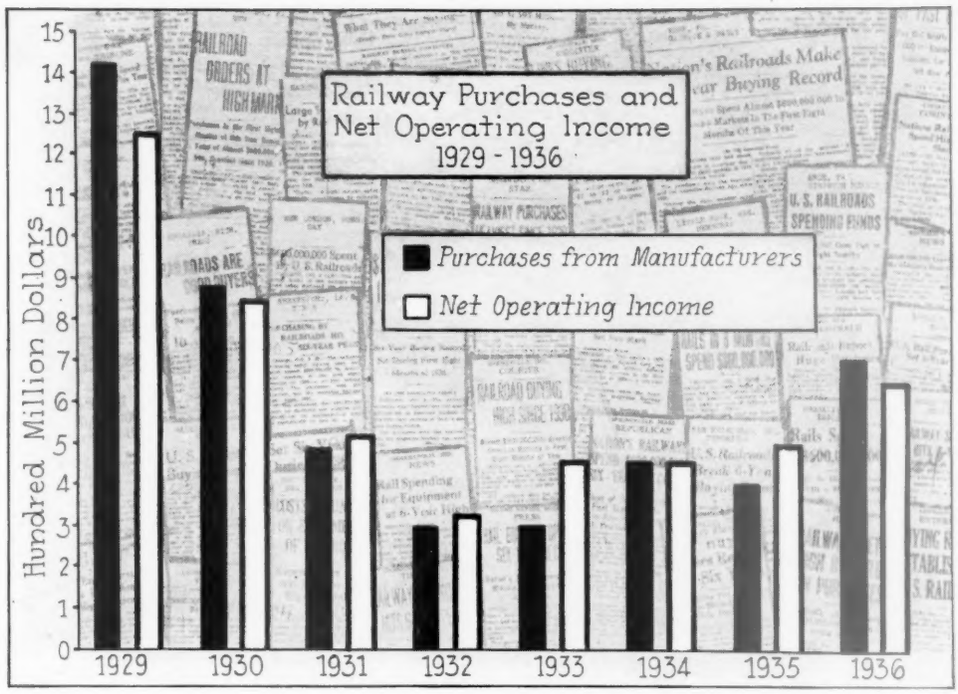
power as well as high starting tractive capacity. One of these locomotives, designed and built by the Norfolk & Western in its own shops, gave a splendid account of itself by developing a maximum of 6,300 drawbar horsepower. Locomotives of this design have proved equally as effective in meeting passenger-train schedules on grades as in handling high-speed freight service. Another steam locomotive of more than ordinary interest is the streamline 4-8-4 type built by Lima for the Southern Pacific for hauling its new Daylight trains between Los Angeles and San Francisco. This locomotive develops, with the booster, a tractive force of 74,710 lb. It is the largest and most powerful streamline locomotive which has yet been built. The color scheme of its finish, which conforms to that of the remainder of the trains, is also striking in its employment of orange and red.

The past year has seen a continuation of the increase in horsepower capacity of Diesel-electric locomotives. In 1934 orders were placed for several 1,800-hp. and two 3,600-hp. locomotives, the latter in two 1,800-hp. vehicle units provided with multiple-unit control. One of the orders placed late in 1936 calls for two locomotives of 5,400-hp., in three 1,800-hp. vehicles controlled in the same manner.

A gradual increase in the use of alloy steels as the material for freight-car construction was evident during the past year. The significant fact, however, is not so much the total amount or spread of the orders as the fact that such materials were specified for extensive use in several large freight-car orders. This marks the progress of these materials beyond the experimental stage of their commercial development. The employment of welding also continues as a means of reducing weight, particularly on cars built by some of the railroads in their own shops.

The A.A.R. standard box car has served as the basic design for most of the box cars built during the year. This is not to say, however, that the cars built are identical with the standard car. In most cases there are variations in dimensions or in some details.

Another interesting development of the year is the general adoption of all-steel construction for the outside bodies of refrigerator cars, following the general trend toward all-steel box cars.



Annual Purchases of Material and Equipment by Class I Railroads Compared with Their Annual Net Operating Income, 1929-1936

$350,000,000 Increase in Railway Buying

Soaring orders raise 1936 purchases to the billion mark—$727,000,000 for manufacturers

By D. A. Steel

Purchases and Stores Editor

THE restorative powers of the railroads and their dependability to spend money when they make it were dramatically demonstrated last year by the large increases in their purchases. With gross revenues from operations in 1936 running 16 per cent above those for 1935, and net operating income exceeding that of the previous year by more than 30 per cent, the railroads of the United States released the largest volume of orders for materials since 1930 and the largest purchases of equipment since 1929. It was a comeback in purchasing, the like of which, in creating optimism and reviving employment, has not been seen since the railroads emerged from government control following the World War.

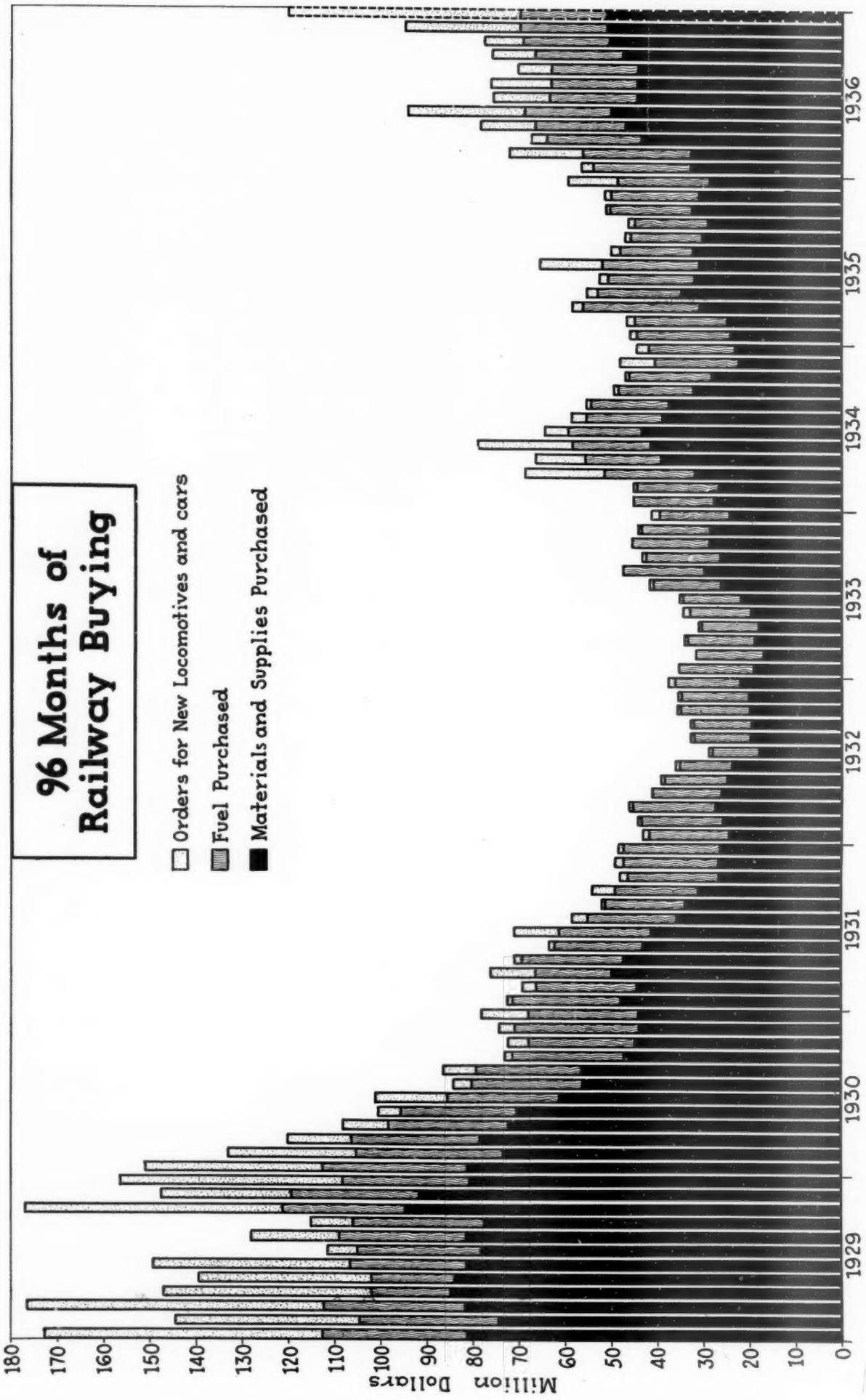
The figures in this summary are necessarily preliminary estimates and are based on special reports from railroads operating 95 per cent of the railway mileage, covering expenditures made by them for materials and supplies and fuel during the first 10 months of 1936, supplemented by this publication's records of orders placed during the year for rail and equipment. From these and related data, it is estimated within close limits that the Class I railroads of the United States made purchases of materials and supplies and equipment last year totaling $982,204,000. In this total was included $534,665,000 of materials and supplies purchased from manufacturers and $192,100,000 of new locomotives and cars ordered from manufacturers—a total of $726,765,000 of materials and supplies and equipment purchased from manufacturers. The remaining $255,439,000 went for coal and fuel oil.

Actually, total purchases in 1936 were larger than this, for the figures do not include materials and equipment purchased by contractors for railway construction work. Neither do they include purchases of heat, light, water and electrical energy, while they also do not include all of the materials purchased for building locomotives and

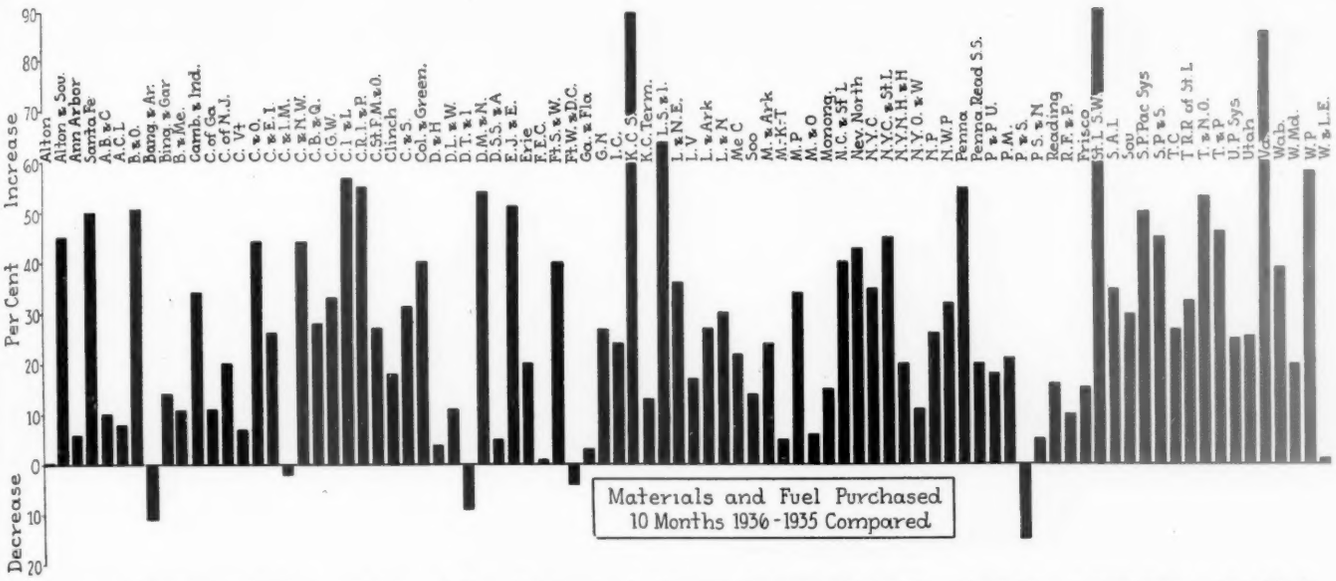
Annual Purchases—Supplies and Equipment*

	Materials received from man'f't'rs (000)	Equipment ordered from man'f't'rs (000)	Total from man'f't'rs† (000)	Fuel (000)	Total including fuel (000)
1929...	$991,795	$435,816	$1,427,611	$336,805	$1,764,416
1930...	727,223	148,529	875,752	308,277	1,184,029
1931...	451,651	36,230	487,881	243,349	731,230
1932...	268,100	2,976	271,076	177,000	448,076
1933...	266,846	6,496	273,342	180,904	454,246
1934...	395,012	69,142	464,154	209,488	673,642
1935...	365,830	36,948	402,778	228,720	631,498
1936...	534,665	192,100	726,765	255,439	982,204

*Subject to revision.
†See text for differences from figures published December 1, 1934.



Railway Purchases of Materials and Supplies, Fuel and the Estimated Value of Orders for Equipment Placed per Month, January, 1929, to December, 1936, as Compiled by the Railway Age



Purchases of Material and Fuel, exclusive of New Equipment, by Various Railroads in the First 10 Months of 1936 Compared with the Corresponding Purchases in 1935

cars in company shops, where the orders were placed too late for the materials to be delivered during the year. While these purchases are indeterminate, they would probably raise the purchases from manufacturers alone more than $100,000,000.

500 Per Cent Increase in Equipment

Purchases of new locomotives and cars from builders last year, amounting to $192,100,000 (excluding equipment to be built in railroad shops), were more than five times larger than in 1935. They exceeded by approximately $40,000,000 the combined purchases of new equipment from manufacturers in the five preceding years and they were larger by approximately $42,000,000, or 28 per cent, than the corresponding purchases in 1930.

Purchases of Material and Supplies—Class I Roads*

	Fuel		Rail		Crossties	
	1936 (000)	1935 (000)	1936 (000)	1935 (000)	1936 (000)	1935 (000)
January	$21,271	$20,800	$1,083	$965	$2,927	$2,080
February	23,721	21,050	2,374	1,540	2,318	2,300
March	21,709	25,500	4,119	1,590	3,199	3,240
April	20,079	18,000	5,376	1,780	3,749	4,060
May	18,746	18,400	5,611	2,140	4,010	3,440
June	18,833	21,050	3,779	1,700	4,036	3,200
July	19,558	15,850	1,919	2,120	3,998	3,420
August	19,726	15,560	1,895	1,060	4,003	3,100
September	20,747	15,610	2,318	1,230	3,897	2,650
October	23,190	17,600	2,829	1,200	3,835	2,420
November†	23,838	19,300	2,908	1,060	3,942	1,880
December†	24,015	20,000	2,930	1,000	3,971	1,500
12 Mos.	255,439	228,720	37,146	17,385	43,890	33,290

	Other Material		Total		Total less fuel	
	(000)	(000)	(000)	(000)	(000)	(000)
January	$29,006	$21,605	$54,289	$45,450	$33,017	$24,650
February	28,416	21,310	56,830	46,200	33,109	25,150
March	35,706	26,420	64,734	56,750	43,025	31,250
April	38,550	29,360	67,755	53,200	47,676	35,200
May	40,965	27,220	69,333	51,200	50,587	32,800
June	37,241	26,800	63,891	52,750	45,057	31,700
July	37,916	26,610	63,392	48,000	43,834	32,150
August	37,651	26,280	63,277	46,000	43,551	30,440
September	40,365	25,510	67,329	45,000	46,581	29,390
October	41,719	29,280	71,574	50,500	48,383	32,900
November†	42,884	28,260	73,574	50,500	49,735	31,200
December†	43,202	26,500	74,119	49,000	50,104	29,000
12 Mos.	453,628	315,155	790,104	594,550	534,665	365,830

*Subject to revision
†Estimated

Purchases of materials and supplies, exclusive of fuel and equipment, from manufacturers in 1936 were larger by $169,000,000, or 45 per cent, than the corresponding purchases in 1935, and were larger by $268,000,000, or 100 per cent, than the corresponding purchases in either 1932 or 1933; they were larger by $83,000,000, or 18 per cent, than in 1931. However, they were still less by 26 per cent than the corresponding purchases in 1930 and fell 46 per cent short of the materials and supplies purchased from manufacturers in 1929.

The combined purchases of materials and equipment from manufacturers were 80 per cent above 1935 and 170 per cent above the corresponding purchases in either 1932 or 1933, although still 50 per cent under 1929. The total purchases of materials and supplies, equipment and fuel in 1936 were larger by approximately $355,000,000 or 55 per cent, than the corresponding total for 1935, and they were larger by approximately $534,000,000, or 128

Classified Purchases, All Roads, 1936*

	(000)	
Frogs, switches and other track materials	$40,476	
Interlocking and signal material	10,749	
Telephone and telegraph material	1,728	
Brick, cement, lime, stone, etc.	4,990	
B & B lumber and piling	14,880	
Switch ties	5,400	
Crossties	43,890	
Bridges, turntables, etc.	1,344	
Ballast and riprap	11,248	
Rail—new and usable	37,146	
Fuel and water station material, etc.	3,968	
Chemicals for timber treatment	2,061	
Total Maintenance of Way and Structures		$177,880
Bolts, nuts, washers, etc.	12,671	
Springs	2,641	
Flues	7,760	
Tubing and soft metals	2,415	
Bar and sheet iron and steel	25,746	
Locomotive and car forgings	13,164	
Locomotive and car castings	40,697	
Brass castings and journal bearings	27,074	
Air brake material	6,784	
Locomotive appliances	9,654	
Passenger car trimmings	5,410	
Electrical material	13,724	
Shop fuel	9,293	
Foundry supplies, firebrick, clay	770	
Wheels, tires and axles	27,384	
Locomotive and car lumber	15,320	
Machinery, boilers, fireboxes and miscellaneous	4,630	
Total Maintenance of Equipment		225,137
Train and station supplies	11,074	
Oil house material	21,099	
Ice house supplies	10,482	
Fuel for locomotives	255,439	
Commissary supplies	20,905	
Total Conducting Transportation		318,999
Iron and steel pipe and fittings	6,584	
Electrical material for buildings	2,475	
Hardware	11,680	
Rubber and leather	6,891	
Glass, drugs, paint, etc.	20,621	
Stationery and printing	13,780	
Unclassified	6,057	
Total Common to All Departments		68,088
Grand Total		$790,104

*Purchases other than Ties, Rail and Fuel, Estimated on the Basis of Reports from 29 Railroads—Subject to Revision

per cent, than in 1932. They fell short of the purchases in 1930 by $202,000,000, or 17 per cent.

In making comparisons between the purchases by railroads from manufacturers in different years, it will prevent confusion later to point out differences between the annual figures in this summary and figures published in 1934* which have been extensively quoted. As already stated, the present figures do not include materials purchased by contractors of railway construction, and thus understate the total purchases from manufacturers. More important, however, equipment purchases in the present compilation represent the approximate value of *orders* placed for equipment during the calendar year instead of the payments actually made for new equipment shown in railway statements of capital expenditures. Aside from the fact that capital expenditures, which were used in previous figures, are only compiled annually and are not available for several months following the close of each year, they show the purchases of equipment in the year when the equipment is installed instead of the year when the orders are placed and construction commenced. The discrepancies which these differences in accounting may cause were illustrated in 1930 when capital expenditures of $328,000,000 for equipment, based on the equipment installed in that year, were $8,000,000 larger than in 1929, whereas *orders* for locomotives in the calendar year of 1930 aggregated only 440, as compared with 1,212 in 1929, and *orders* for freight cars in the calendar year of 1930 totaled only 46,360, as compared with 111,218 in 1929.

Purchases of equipment based on the value of orders, therefore, while less accurate than capital expenditures in expressing true costs, have the merit of more nearly indicating the degree of activity of railway buying in any year. Since our statistics of materials and supplies purchased are based on official reports of the materials *received* by the railroads, they may also fail to show true comparisons between different years by not including materials ordered too late to be delivered in the year stated, but the discrepancy is much less pronounced than with capital expenditures, and no changes have therefore been made in our compilations of such statistics.

* Railway Age, December 1, 1934.

Rail Purchases Double

There were included in the 1936 purchases approximately $37,146,000 of rail, $43,890,000 of crossties and $453,628,000 of miscellaneous materials. This was an increase of 110 per cent in rail purchases, 30 per cent in tie buying and a 45 per cent increase in the purchase of miscellaneous supplies. Based on expenditures reported in further detail by 29 railroads, it has been estimated that the purchases of miscellaneous material last year included $40,476,000 of frogs, switches, fastenings and other track materials, $11,500,000 of signaling and telephone material, $12,671,000 of bolts, nuts and washers, approximately $25,000,000 of iron and steel bars and plate, $13,000,000 of car and locomotive forgings, $41,000,000 of car and locomotive castings, $27,000,000 of bearings and other products of copper and brass, $13,700,000 of electrical material, $27,380,000 of wheels, tires and axles, $21,000,000 of illuminating oil and lubricants, and $11,680,000 of hardware. Further subdivisions of the purchases in 1936 are given in a table.

All Roads Buy More

Almost every railroad in the United States bought more heavily in the markets of the country last year than in previous years. Purchases of materials and fuel, exclusive of new equipment, for the 10 months of 1936 were greater than in the corresponding period of 1933 by 45 per cent on the Alton & Southern; 50 per cent on the Atchison, Topeka & Santa Fe; 8 per cent on the Atlantic Coast Line; 50 per cent on the Baltimore &

Purchases of Fuel and Supplies—10 Months

	1933	1934	1935	1936
Akron, Canton & Y'gst'n	$.....	$.....	$.....	$ 299,068
Alton	1,605,601	3,503,056	3,385,789	3,886,037
Alton & Southern	.....	.....	160,464	233,248
Ann Arbor	.....	.....	723,688	776,531
A. T. & S. F. Lines	14,616,585	20,097,692	21,895,717	32,380,387
Atlanta, Birm. & Coast	.....	589,276	626,987	691,115
Atlantic Coast Line	4,857,590	7,382,487	6,464,370	7,597,509*
Baltimore & Ohio	9,303,569	19,804,459	16,587,242	24,673,727
Bangor & Aroostook	793,396	1,077,172	1,195,147	1,055,024
Bingham & Garfield	.....	.....	127,562	145,256
Boston & Maine	5,051,649	8,616,378	5,826,203	6,461,878
Burlington-Rock Island	.....	.....	.....	79,596
Cambria & Indiana	.....	116,344	96,614	129,393
Central of Georgia	1,834,028	2,411,128	2,549,217	2,849,767
Central of New Jersey	3,233,832	3,345,610*	3,765,728	4,515,320
Central Vermont	971,323	1,040,138	1,241,232	1,334,232
Charleston & W. Carolina	.....	357,001	370,808	392,000*
Chesapeake & Ohio	8,059,219*	12,226,682	10,080,126	14,456,682
Chicago & Eastern Ill.	1,413,399	1,895,878	2,038,254	2,556,676
Chicago & Ill. Midland	340,330	429,204	431,279	422,141
Chicago & North Western	9,881,890	13,833,006	13,068,726	18,847,280
Chi., Burl. & Quincy	8,975,310	13,033,797	12,942,055	16,568,123*
Chicago Great Western	2,492,427	2,889,426	2,899,465	3,855,367
Chicago, Ind. & Louisville	875,255	878,868	874,288	1,375,418
Chi., R. I. & Pac. Lines	7,517,041	10,378,771	10,534,560	16,219,190
Chi., St. P., Minn. & Om.	2,372,383	2,927,072	3,000,067	3,820,993
Clinchfield	497,152	830,368	811,175	953,463
Colorado & Southern	.....	.....	1,066,157	1,397,364*
Columbus & Greenville	123,337	179,200	181,862	251,497
Delaware & Hudson	3,590,861	4,430,453	4,302,896	4,478,290
Del., Lack. & Western	5,332,293	6,290,374	6,277,745	6,981,812*
Det. & Toledo Shore Line	.....	.....	.....	399,693
Det., Toledo & Ironton	332,602	629,246	869,866	783,103
Dul., Missabe & Northern	803,544	1,464,742	1,259,416	1,939,812
Duluth, S. S. & Atlantic	223,938	351,341	391,982	414,231
Elgin, Joliet & Eastern	1,258,993	1,144,419	1,393,887	2,098,159
Erie	9,007,066	12,654,323	9,676,363	11,539,115
Florida East Coast	914,061	1,145,499	1,291,776	1,312,555
Fort Smith & Western	.....	113,423	79,687	110,176
Ft. Worth & Denver City	.....	.....	951,677	909,908
Georgia & Florida	.....	.....	286,020	294,652
Great Northern	6,786,193	12,792,451	10,724,354	13,481,576
Illinois Central	11,875,669	15,706,612	14,063,042	17,453,658
Kansas City Southern	1,050,478	1,375,738	1,291,123	2,459,520
Kansas City Terminal	.....	.....	588,429	667,021
Lake Sup. & Ishpeming	$139,190	$204,921	$172,614	$283,582
Lehigh & New England	424,817	606,012	425,609	588,969
Lehigh Valley	.....	.....	6,881,567	8,099,751
Louisiana & Arkansas	395,149	808,636	820,708	1,117,521
Louisville & Nashville	7,355,182	8,534,151	9,646,956	12,492,615
Maine Central	1,381,437	2,526,714	2,010,174	2,451,710
Minn., St. P. & S. S. M.	3,003,433	3,785,202	3,969,019	4,519,061
Missouri & Arkansas	.....	.....	129,210	160,443*
Missouri-Kansas-Texas	2,373,883	4,172,373	3,474,247	3,632,101
Missouri Pacific Lines	11,990,507*	17,397,134	17,041,350	22,832,952*
Mobile & Ohio	1,117,209	1,279,764	1,560,858	1,658,407
Monongahela	.....	331,213	267,049	309,566*
Nash., Chat. & St. Louis	2,240,786	2,227,203	1,935,823	2,670,093
Nevada Northern	.....	.....	93,746	134,855
New York Central Sys.	37,937,263	48,448,461	44,243,136	59,878,100
N. Y., Chi. & St. Louis	3,289,977*	4,637,651	4,158,896	6,032,544
N. Y., New Hav. & Hart.	4,867,842	8,837,178	8,818,592	10,648,366
N. Y., Ont. & Western	.....	.....	1,297,364	1,445,350
Northern Pacific	6,359,684	8,866,437	9,118,646	11,563,602
Northwestern Pacific	255,052	301,872	275,830	365,353
Penna. and Long Island	34,091,189	48,478,663	37,992,095	58,868,991
Penna.-Read. S. S. Lines	.....	.....	329,335	396,771
Peoria & Pekin Union	.....	.....	263,021	312,376
Pere Marquette	3,197,781*	3,924,077	4,296,807	5,211,617
Pittsburg & Shawmut	98,523	89,040	110,811	93,524
Pitt., Shawmut & North.	115,915	189,430	142,665	149,108
Reading	4,800,598	6,757,279*	6,199,198	7,214,566
Richmond, Fred. & Pot.	964,674	1,222,969	1,287,094	1,406,803
St. Louis-San Francisco	7,009,754	8,530,505	8,103,808	9,304,006
St. Louis Southwestern	831,037	1,173,140	1,567,229	3,758,990
Seaboard Air Line	.....	8,183,972	5,553,516	7,547,303
Southern	9,076,863	13,872,296	14,554,385	18,694,390
Southern Pac.-Pac. Sys.	9,031,881	16,444,226	15,889,171	24,005,187
Southern Pac.-Tex. & La.	2,618,936	4,780,364	4,261,246	6,539,445
Spokane, Port. & Seattle	598,317	1,604,238*	938,004	1,359,939
Tennessee Central	276,909	333,918	348,071	442,459
Terminal of St. Louis	.....	.....	1,006,965	1,330,227
Texas & Pacific	2,060,302	3,074,173	3,454,270	4,949,025
Union Pacific Sys.	17,570,361*	19,770,145	25,276,796	31,675,006
Utah	.....	70,325	90,113	113,161
Virginian	.....	1,297,466	1,415,115	2,597,770
Wabash	3,987,973	6,283,656	5,296,722	7,344,747
Western Maryland	1,708,933	3,007,533	2,414,218	2,889,387
Western Pacific	1,607,640*	2,270,000	3,120,950	5,272,000*
Wheeling & Lake Erie	1,185,117	2,054,836	2,549,796	2,600,635

*October estimated.

Fuel and Materials and Supplies in Stock—Book Values—on October 31

	Rail—New & S. H.		Total	
	1935	1936	1935	1936
Akron, Canton & Y'gst'n	$.....	$ 13,747	$.....	$ 96,868
Alton	189,102	63,328	1,124,841	746,329
Alton & Southern	4,106	22,089	49,341	65,389
Ann Arbor	19,265	17,489	250,695	255,864
Atchis'n, Top. & Santa Fe	3,407,036	2,657,495	16,993,693	17,138,906
Atlantic Coast Line	440,709	421,688*	2,936,105	2,852,310*
Baltimore & Ohio	746,107	396,155	8,096,589	9,225,427
Bangor & Aroostook	84,717	70,211	865,340	775,995
Bingham & Garfield	19,340	16,100	76,190	59,800
Boston & Maine	629,577	463,209	4,719,200	4,214,494
Cambria & Indiana	4,003	13,433	52,984	63,131
Central of Georgia	110,708	19,746	906,969	1,030,507
Central of New Jersey	139,048	.....	1,573,744	.....
Central Vermont	44,034	53,896	579,645	478,310
Charleston & Westn. Car.	72,519	63,139*	212,397	198,533*
Chesapeake & Ohio	.....	.....	3,908,940	3,966,036
Chicago & Eastern Illinois	16,263	238,878	693,459	845,926
Chi. & Illinois Midland	23,117	24,328	240,966	271,690
Chicago & North Western	1,268,392	1,325,808	7,227,938	8,808,944
Chi., Burl. & Quincy	885,445	755,601*	7,135,700	7,766,679*
Chicago, Great Western	3,250	8,282	525,259	618,539
Chicago, Ind. & Louisville	68,059	75,722	620,629	750,122
Chi. Rock Island & Pac.	294,880	1,198,765	5,059,332	7,166,961
Chi., St. P. M. & Omaha	144,957	178,701	1,074,967	1,154,843
Clinchfield	103,855	13,085	582,075	411,827
Colorado & Southern	32,149	104,111	291,213	403,011
Columbus & Greenville	3,269	2,802	113,448	126,846
Delaware & Hudson	93,658	121,564	2,346,603	2,196,313
Detroit, Toledo & Ironton	75,039	21,068	454,510	388,856
Det. & Toledo Shore Line	.....	15,041	.....	94,753
Dul., Missabe & Northern	89,556	70,609	969,400	1,023,407
Dul., S. S. & Atlantic	96,565	84,370	324,695	294,977
Elgin, Joliet & Eastern	41,824	30,220	630,494	780,831
Erie	415,051	387,397	3,331,031	3,453,474
Florida East Coast	102,196	100,329	1,492,601	1,465,009
Fort Smith & Western	4,555	4,724	163,002	166,558
Great Northern	769,403	631,824	6,758,918	7,391,688
Illinois Central	64,622	41,457	6,475,222	5,805,607
Kansas City Terminal	3,562	14,032	138,207	163,115
Lake Sup. & Ishpeming	15,605	84,842	200,631	340,520
Lehigh & New England	76,102	80,729	352,141	364,246
Lehigh Valley	$ 210,037	$ 134,024	$2,756,760	$2,935,032
Louisiana & Arkansas	65,764	115,512	703,296	796,053
Louisville & Nashville	710,801	574,067*	7,869,031	7,381,082
Maine Central	157,209	132,023	1,424,476	1,395,357
Minn., St.P. & S.S. Marie	197,027	122,831	1,797,684	1,785,530
Missouri & Arkansas	5,491	.....	59,787	50,998*
Missouri Pacific Lines	947,669	.....	9,142,918	.....
Mobile & Ohio	157,467	57,000	804,357	779,961
Monongahela	22,529	5,278	239,149	187,933
Nevada Northern	6,400*	4,793	81,266*	93,976
New York Central	.....	.....	27,376,027	25,592,881
N. Y., Chi. & St. Louis	.....	.....	1,210,899	1,524,735
N. Y., New Hav. & Hart.	1,347,002	944,040	5,928,459	4,949,303
New York, Ont., & West.	99,662	69,001	722,083	652,612
Northwestern Pacific	49,781	33,885	204,926	163,149
Penna. and Long Island	4,157,319	4,612,550	27,998,108	30,686,044
Penna.-Read. S. S. Lines	66,741	58,330	172,643	166,112
Peoria & Pekin Union	15,857	9,626	111,248	101,616
Pere Marquette	.....	.....	1,330,439	1,499,238
Pittsburg & Shawmut	17,393	25,455	100,963	97,331
Pitt., Shawmut & North.	14,422	16,706	110,124	99,470
Reading	746,504	.....	5,084,160	.....
Richmond, Fred. & Pot.	.....	.....	753,648	765,573
St. Louis-San Francisco	506,454	462,751	4,294,500	3,961,724
St. Louis Southwestern	82,039	122,756	974,099	1,430,350
Seaboard Air Line	598,351*	606,954	3,540,702*	3,658,082
Southern	396,105	264,847	5,578,804	6,598,949
Southern Pac.-Pac. Lines	1,874,501	896,242	9,323,084	9,302,967
S. Pac.-Tex. & La. Lines	611,168	560,899	3,888,499	4,149,956
Spokane, Port. & Seattle	78,891	87,813	516,961	583,483
Tennessee Central	.....	.....	187,714	177,208*
Terminal of St. Louis	33,894	66,171	348,376	411,389
Texas & Pacific	226,062	299,105	3,038,091	3,530,018
Union Pacific Sys.	2,383,868	3,404,728	16,407,174	19,861,921
Utah	27,083	25,685	168,122	182,473
Virginian	89,834	91,767	1,469,317	1,555,846
Wabash	199,446	352,956	1,468,010	2,082,129
Western Maryland	1,660	2,430*	1,473,948	1,473,690*
Western Pacific	61,463	110,200*	1,666,393	2,194,900*
Wheeling & Lake Erie	235,763	138,649	1,030,083	957,565

*September

Ohio; 11 per cent on the Boston & Maine and the Central of Georgia; 20 per cent on the Central of New Jersey; 44 per cent on the Chesapeake & Ohio; 26 per cent on the Chicago & Eastern Illinois; 44 per cent on the Chicago & North Western; 33 per cent on the Chicago Great Western; 56 per cent on the Chicago, Indianapolis & Louisville; 55 per cent on the Chicago, Rock Island & Pacific; 31 per cent on the Colorado & Southern; 11 per cent on the Delaware, Lackawanna & Western; and 54 per cent on the Duluth, Missabe & Northern.

The increase in 10 months' buying last year over the same months of 1935 amounted to 51 per cent on the Elgin, Joliet & Eastern; 20 per cent on the Erie; 27 per cent on the Great Northern; 24 per cent on the Illinois Central; 90 per cent on the Kansas City Southern; 17 per cent on the Lehigh Valley; 30 per cent on the Louisville & Nashville; 14 per cent on the Minneapolis, St. Paul & Sault Ste. Marie; 35 per cent on the Missouri Pacific lines; 40 per cent on the Nashville, Chattanooga and St. Louis; 35 per cent on the New York Central; 26 per cent on the Northern Pacific; 55 per cent on the Pennsylvania; 15 per cent on the St. Louis-San Francisco; 35 per cent on the Seaboard Air Line; 29 per cent on the Southern; 50 per cent on the Southern Pacific; 46 per cent on the Texas & Pacific; 25 per cent on the Union Pacific; and 85 per cent on the Virginian.

Divisions of Supplies in Stock—October 31 (Estimated)

	Fuel (000)	Ties (000)	Rails (000)	Stores Stock (000)	Scrap (000)	Total (000)
1933	$20,500	$50,000	$34,000	$182,500	$8,500	$295,500
1934	19,500	42,000	39,000	202,000	7,500	310,000
1935	22,100	36,500	36,000	179,000	6,400	281,000
1936	21,537	35,404	31,458	198,092	6,006	293,000

Trend Up All Year

The combined purchasing of the railroads in 1936 was not only larger each month than it was in the corresponding months of the previous year, but with the exception of a less than normal decline last summer, it continued to increase throughout 1936. Purchases of materials and supplies, exclusive of equipment, from manufacturers for the month of October totaled approximately $48,383,000, as compared with $33,017,000 in January; while the purchases of supplies, inclusive of fuel, totaled $71,574,000, as compared with $54,289,000 in January. Since September, unusually large orders were placed for equipment and rail. During the last three months of 1936, the railroads purchased over $40,000,000 of freight cars, as compared with $10,000,000 in the last quarter of 1935, and $11,000,000 in the last quarter of 1930; and they also contracted for more than $30,000,000 of rail since September, as compared with $6,500,000 of rail ordered in the last three months of 1935 and $20,000,000 in the last three months of 1930. The actual orders placed during this period for locomotives, cars and rail are reported elsewhere in this issue.

Purchases and Net Earnings

While annual figures establish the upward trend of railway buying and show the huge sums which the railroads are already pouring into the markets of the country, the extent of the recovery is shown most graphically by the purchases made from month to month since January, 1929. As shown clearly in a chart which has been prepared to cover 96 months of railway buying, the purchases made by the railroads for materials and supplies and equipment, after declining from a maximum of $180,000,000 in one month in 1929 to a minimum of $29,000,000 in July, 1932, rose irregularly until 1935 and then gathered impetus which carried them on up to an estimated total in December, 1936, of $120,000,000—the highest point reached in railway buying per month since January, 1930.

To some extent the recent increases in railway purchase totals reflect increased prices. Also, the heavy purchases made by the railroads since last October, espe-

cially of rail and equipment, were stimulated by impending increases in material costs. During 1934, purchases owed a large part of their increase to government loans. It is also true that large expenditures must be made every year to keep the railroads running, regardless of earnings.

For the most part, however, it was the drastic decline of net earnings that caused the railroads to reduce their buying from 1930 to 1933, and it was the increase in their earnings which enabled the railroads to increase their purchases since that time, especially their purchases of new equipment.

A comparison between the annual purchases of materials and equipment from manufacturers by the Class I railroads and their net railway operating incomes (operating revenues minus operating expenses, exclusive of taxes) is significant. In 1929, the net operating income of Class I railroads for the year was $1,251,000,000 and the purchases of materials and equipment from manufacturers totaled $1,427,611,000. In 1930, the net was $868,879,000 and the purchases $875,752,000. In 1931, the net was $525,628,000 and the purchases $487,881,000. In 1932, the net was $326,298,000 and the purchases $271,076,000. In 1934, the net was $462,652,000 and the purchases $464,154,000; and in 1935, when the net was $499,819,000, purchases were $402,778,000, while in 1936, when the net was expected to reach $650,000,000, the purchases of materials and equipment from manufacturers totaled $726,000,000.

The total for the year 1930 shows a reduction in net operating income from 1929 of 31 per cent and a reduction in purchases from manufacturers of 39 per cent. The total for 1931 shows a reduction in net operating income from 1930 of 39 per cent and a reduction in purchases of 43 per cent, and the total for 1932 shows a decline of 38 per cent in the net operating income from the previous year and a decline of 43 per cent in purchases. If 1933 and 1934, the first two years in the transition from decreasing to increasing revenues and purchases are disregarded, it will be seen that the total net for 1935, showed an increase of 8 per cent over 1934, which was accompanied by an increase of 13 per cent in the purchases from manufacturers; while in 1936, an estimated increase of 32 per cent in the year's net was accompanied by an 80 per cent increase in the year's purchases from manufacturers. The difference between the percentage increase of net and purchases in 1936 would be less if only the figures for the last half of the year were considered.

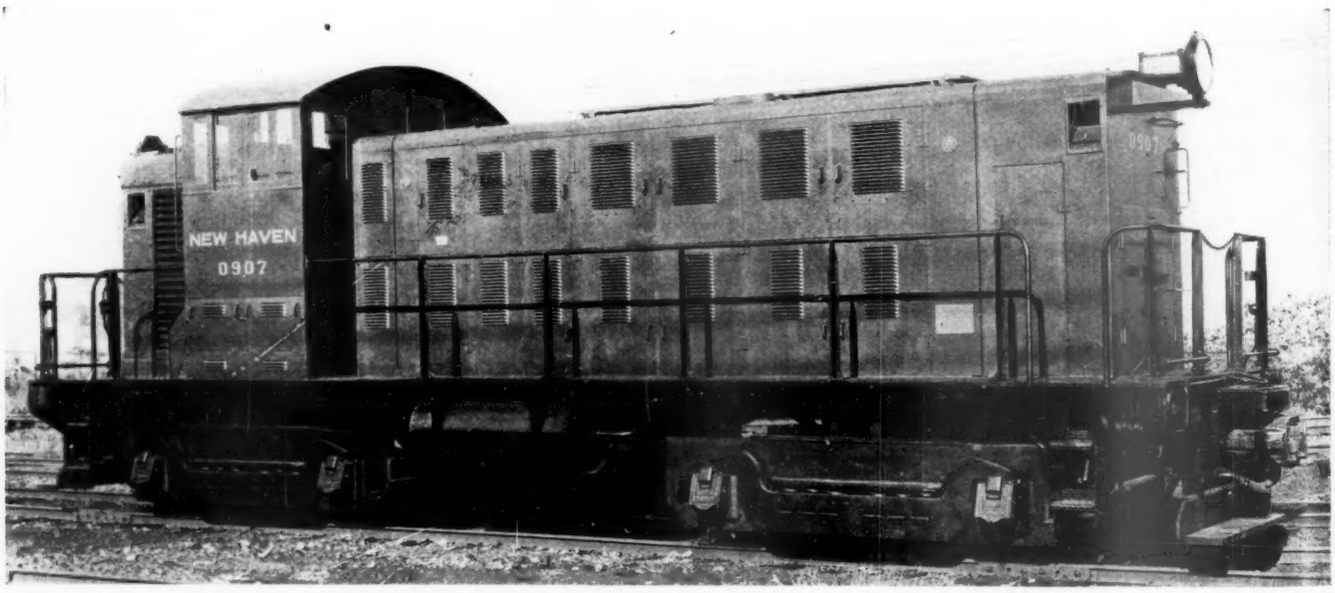
In any comparison between earnings and purchases, it should not be overlooked that increases in purchases tend to lag somewhat behind increases in earnings. The marked uniformity between the two sets of figures, however, demonstrates that the extent to which railroads can keep their properties in a good state of repair, make desired improvements in transportation and otherwise employ their vast purchasing power in sustaining general prosperity and industrial employment is contingent upon their earnings. Should the improvement in net earnings continue, as it is expected to improve, it requires no prophet to forecast the direction which railway buying will take.

Larger Inventories

It is too early to measure the full effect of the increased railway buying on railway inventories, but it is inevitable that increases in prices will be reflected in the book values of unapplied materials in stock at the close of the year, while increases in the volume of this material should also result from the necessity facing the railroads of increasing depleted stocks with materials required for the heavier rate of railway consumption and to protect programs of work against the slower rate at which most orders are now being filled. Many roads have stored coal to relieve the car situation in January and February and most roads increased their orders of equipment and other materials last fall to avoid increases in prices which become effective this year.

The tendency toward increases in inventories was reflected in the figures for October 31 when the total book value of material in stock was approximately $293,000,000, consisting of $21,537,000 of fuel, $31,458,000 of rail, $35,404,000 of crossties, $198,092,000 of stores stock and $6,006,000 of scrap. The book values of rail and tie stocks and the inventory of unsold scrap were not as large as on October 31, 1935, but stocks of maintenance and repair materials showed an increase of $20,000,000, or 11 per cent. The total inventories and the rail inventories of various railroads on October 31, 1936 and 1935, are given in one of the tables.

* * * *



One of Ten Diesel-Electric Switchers Built by General Electric for the New Haven, Five of Which Are Equipped with Ingersoll-Rand Diesel Engines and Five with Cooper-Bessemer Engines

Construction of Second Track on Diverted Line—Chicago, Burlington & Quincy, Chariton, Iowa

Railway Construction Shows Signs of Upturn

New-line mileage more than doubles and other activities give indication of revival—Abandonments again decrease

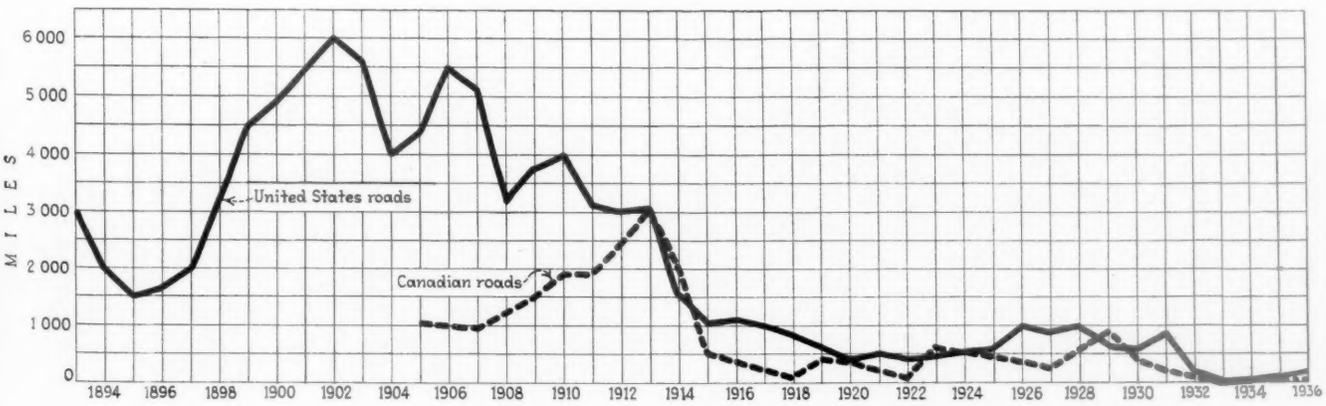
By George E. Boyd

Associate Editor

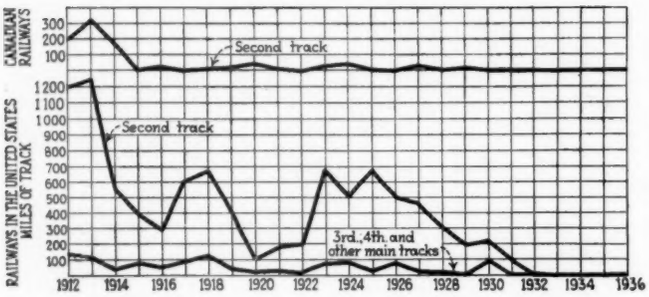
ALTHOUGH railway construction measured either by volume or total expenditure, in 1936 touched the lowest point it has ever reached, there are unmistakable signs that the tide has now turned and is beginning to flow. As yet this upward trend is small, but it is perceptible. Following 1930, during which year railway construction, other than new lines, reached an all-time high, new projects have not been started to offset those that were completed year by year. For this reason, both the number of projects and the sum being spent for improvements and extensions has shown a steady shrinkage, until the carry-over into 1936 was the smallest of record.

As earnings have shown signs of permanent improvement, however, many of the projects that, though badly needed, were deferred, are being revived and not a few of them have already been authorized, some are under construction and others are being included in the annual budgets for 1937. Still other projects upon which work was suspended as earnings began to shrink, are being reopened and will now be carried to completion. Furthermore, there is a need for some forms of construction to make the new methods of operation which have been developed in recent years more fully effective.

During the latter part of the depression, grade-crossing elimination became an exception to the general recession in construction activities, as a result of federal grants for this class of work. At first only partial grants were made, but beginning in 1935, large sums were appropriated to cover the entire cost of grade separations and, as this money became available in 1936, an unprecedented amount of this work was under way or completed



New Lines Constructed in the United States Increased to 93 Miles in 1936. Only One Mile Completed in Canada



Nine Miles of Multiple Track Completed in 1936

during the year. To November 30, the latest date for which figures are available, federal appropriations had been made to cover 1,886 crossing projects, including 1,640 grade separations and the reconstruction of 246 existing grade-separation structures. This is exclusive of grade-crossing protection, 719 projects for which have also been approved. During the year, 1,364 grade separation and reconstruction projects were under way or completed. This number included, however, a few that had been arranged for previously, and which were not therefore, included in the grants, but which were carried out jointly by the railways and the states. In addition to these 1,886 projects, 185 grade separation and 43 reconstruction jobs, 228 in all, had, on November 30, been approved for federal grants.

It is obvious that, aside from the separation of grades, the railways have a real interest in these projects, for they commonly design and construct the bridges carrying their tracks over subways, while they must be certain that the design and construction of the overcrossings is such as not to interfere with or endanger their operations. The cost of those grade-crossing projects which have been completed or are now under construction amounts to $149,121,201. Federal appropriations for this work total $146,061,345, leaving $3,059,856 to be borne by the railroads and the states or municipalities, primarily for additional land and to cover property damage. In addition, the 228 jobs which have just been approved are estimated to cost $20,825,969, as an offset to which federal funds in the amount of $20,233,199 have been appropriated.

Miles of Main Track Built in 1936

U. S.	Number of companies building	First track	Second track	Third track	Fourth track	Total
California	1	2.80	...	...	...	2.80
Georgia	1	1.70	...	...	...	1.70
Iowa	1	...	4.73	...	...	4.73
Louisiana	1	...	...	1.78	...	1.78
Michigan	1	...	...	0.08	...	0.08
Minnesota	1	0.98	...	...	...	0.98
Montana	1	0.06	...	...	...	0.06
Ohio	2	13.58	2.66	...	...	16.24
Oregon	3	24.80	...	...	...	24.80
Texas	1	13.60	...	...	...	13.60
Virginia	1	35.76	...	...	...	35.76
Total		93.28	7.39	1.86	...	102.53

New Mileage Increases

Analysis of the construction records over a long period discloses that the mileage of new lines under construction or completed in any year provides an excellent index of railway construction activities as a whole. Confirming other indications of an upward trend in railway construction, 93 miles of new lines were completed during the year. This is more than double the 45 miles completed in 1935.

During the 20-year period prior to 1916, the mileage of new lines completed annually varied from 933 in 1915 to 6,026 in 1902, the latter being the largest mileage ever recorded for a single year. The average mileage completed year by year during these two decades was 3,765. During the 20-year period ending with 1936, the largest mileage completed was in 1928, when 1,025 miles were placed in operation, and the smallest was the 24 miles completed in 1933. The average for these two decades was 514 miles a year. These figures point impressively to the fact that the days of large external development have passed and that future expenditures will be made more and more for internal improvements.

Of the 93 miles of new lines completed during the year, the largest single project was that of the Norfolk & Western, which extended its Buchanan line and built a branch from this line up Dismal Creek, in the vicinity of Grundy, Va., to reach some large coal deposits in this section. The next longest line was that of the Carlton & Coast, which completed 20.72 miles between Carlton, Ore., and Cody, this being in addition to the 9.52-mile line which it completed in 1935.

Miles of New Line Completed in the United States Since 1893

1893	3,024	1915	933
1894	1,760	1916	1,098
1895	1,420	1917	979
1896	1,692	1918	721
1897	2,109	1919	686
1898	3,265	1920	314
1899	4,569	1921	475
1900	4,894	1922	324
1901	5,368	1923	427
1902	6,026	1924	579
1903	5,652	1925	644
1904	3,832	1926	1,005
1905	4,388	1927	779
1906	5,623	1928	1,025
1907	5,212	1929	666
1908	3,214	1930	513
1909	3,748	1931	748
1910	4,122	1932	163
1911	3,066	1933	24
1912	2,997	1934	76
1913	3,071	1935	45
1914	1,532	1936	93

Not all of the new lines shown represent a net increase in mileage, for some were in the nature of line revisions, with approximately corresponding abandonments to offset them. An example was the 13.60 miles constructed by the Southern Pacific in Texas, where a line revision was undertaken to raise the roadbed and track above the flood plane in Sanderson canyon, to reduce curvature and to eliminate 12 bridges over Sanderson and Thurston creeks. Likewise, the new mileage reported by the Pennsylvania and the Erie in Ohio was constructed to get the tracks of these roads above the pools created by several dams which are being constructed by the Muskingum Conservancy district in that state.

Miles of New Lines Completed in Canada Since 1904

1904	316	1920	305
1905	1,181	1921	252
1906	1,007	1922	145
1907	976	1923	655
1908	1,249	1924	615
1909	1,488	1925	414
1910	1,844	1926	335
1911	1,898	1927	310
1912	2,232	1928	723
1913	3,013	1929	841
1914	1,978	1930	385
1915	718	1931	250
1916	290	1932	121
1917	207	1933	0
1918	135	1934	1
1919	433	1935	2
		1936	1

At the close of the year the Atchison, Topeka & Santa Fe had 111 miles of new line under construction in

Oklahoma and Colorado, this being the last gap in the new route which this road is providing between Denver, Colo., and Houston, Tex. Approximately 27 miles of line revisions remain to be completed for the four roads involved in the flood-control work in the Muskingum Conservancy district in Eastern and Southern Ohio. This work is being done by the Corps of Engineers, United States Army which is also building a 15-mile line for the Baltimore & Ohio along the Tygart river near Grafton, W. Va., in connection with the flood-control dam which is being installed in that stream by the government. The largest new-line project is that of the Gold Coast, which proposes to build a line from Port Orford, Ore., to Leland, 90 miles, and which has received authority from the I.C.C. to do so.

The construction of new lines in Canada remained at a complete standstill, no new lines having been under way or completed during the year. In fact, no new lines have been built in this country since 1932, the mileage of new main track shown in the tabulation since that date having all been in connection with line revisions, as revealed in the detailed description of construction activities for these years. The single mile completed during 1936 compares with none in 1933, 1 mile in 1934, 2 miles in 1935, 121 miles in 1932 and with 3,013 miles in 1913, the year of largest construction since 1904, when the compilation of this record was started.

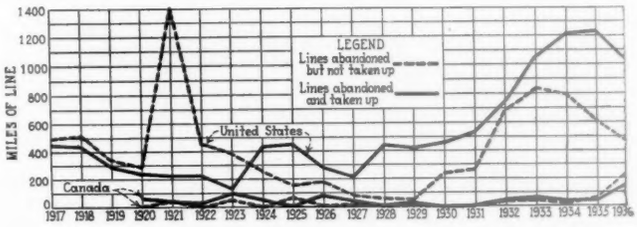
Multiple-Track Mileage

Multiple track mileage completed in 1936 varied only slightly from the previous year, the principal project having been the second-track work on the Chicago, Burlington & Quincy, 4.73 miles, a short distance west of Chariton, Iowa, to complete the double tracking of its line between Chicago and Red Oak, Iowa. This work also involved a reduction in curvature and of gradient from 1.3 per cent to 0.66 per cent. The next largest job was 2.66 miles of second track on the Erie in Ohio, in connection with the Muskingum Conservancy district flood-control work. The Public Belt of New Orleans added 1.78 miles of third track.

During the year 7.39 miles of second track and 1.86 miles of third track were completed. This stands in strong contrast with the more than 1,200 miles of second track completed in 1913 and as much as 600 and 700 miles a year in several later years. Likewise, during the period since 1912, the mileage of third and fourth tracks has equalled or exceeded 100 miles in each of seven years. However, since 1925, there has been a general trend toward restriction of multiple-track construction as a result of developments in the signaling field, which have greatly increased the traffic capacity of lines upon which these new systems of traffic control have been installed.

Miscellaneous Construction

Among the larger projects completed or still under way at the close of the year, the Pennsylvania continued work on the track elevation, new station and bridges across the Passaic river at Newark, N. J. The New York Central has also continued according to schedule the work on its West Side improvement in New York. Although, relatively, this project is nearing completion,



Abandonments in the United States Again Decreased—Those in Canada Increased

Lines Abandoned in the United States, Canada and Mexico in 1936

United States	Lines abandoned and taken up Miles	Lines abandoned but not yet taken up Miles
Alabama Central		
Autaugaville, Ala., to Forrester	2.30	
Alcolu		
Alcolu, S. C., to Olanta	25.00	
Atchison, Topeka & Santa Fe		
Arkansas City, Kan., to Gueda Springs	5.98	
Atlantic & Yadkin		
Stokesdale, N. C., to Madison	11.39	
Atlantic Coast Line		
Various branch lines in Florida	40.00	
Atlantic Northern		
Atlantic, Iowa, to Kimballton	17.10	
Baltimore & Ohio		
Austin, Pa., to Keating Summit	7.66	
Mineral City, Ohio, to Valley Junction	1.35	
Bellevue & Cascade		
Bellevue, Iowa, to Cascade	35.70	
Boise & Western		
Boise, Idaho, to Star		16.00
Boston & Maine		
Epping, N. H., to West Gonic	15.83	
Franklin, N. H., to Bristol		12.78
Butte, Anaconda & Pacific		
Butte, Mont., to Anaconda	1.43	
Canadian Pacific		
Elkhurst, Vt., to International Boundary	1.00	
Carlton & Coast		
Cedar Creek Junction, Ore., to Tillamook Gate	2.86	
Central of New Jersey		
Drifton Junction, Pa., to Scale Siding	2.37	
Central West Virginia & Southern		
Hendricks, W. Va., to Harman	21.10	
Chicago & North Western		
At Rib Falls, Wis.	4.75	
At Jeffris Junction, Wis.	2.11	
Paines Spur, Wis., to Parrish	1.70	
Chicago Mine Branch, Mich.	6.86	
Rochester, Minn., to Zumbrota	24.48	
Mission Hill, S. D., to Yankton	5.19	
Caledonia, Ill., to Harlem		8.45
Sycamore Junction, Ill., to Cortland		4.64
Denison, Iowa, to Deloit		6.16
Hurley, Wis., to Pence		7.00
Sherry Junction, Wis., to Kent		1.85
Chicago, Burlington & Quincy		
Clarinda, Iowa, to Norwich	13.54	
Sedan, Iowa, to Novinger, Mo.	31.25	
South Gifford, Mo., to Elmer	4.69	
Chicago Great Western		
Rollingstone, Minn., to Gilmore	7.46	
Chicago, Mliwaukee, St. Paul & Pacific		
Brampton, N. D., to Cogswell	7.49	
Shady Grove, Ind.	0.12	
Squalicum Junction, Wash.	0.95	
Monroe, Wash., to Lowell, Wash.		11.74
Scotland Junction, S. D., to Tyndall		11.24
Chicago, Rock Island & Pacific		
Newton, Iowa, to Reasoner		10.42
Ingersoll, Okla., to Anthony, Kan.		32.83
Preemption, Ill., to Sherrard		4.46
Chicago, St. Paul, Minneapolis & Omaha		
Hannibal, Wis., to Hughey	4.19	
Chicago Short Line		
At Chicago	0.56	
Colorado & Southern		
Sullivan, Colo., to Falcon	64.03	
Superior, Colo., to Crown Mine	1.58	
Delaware, Lackawanna & Western		
Branchville Junction, N. J., to Franklin	9.16	
Denver & Rio Grande Western		
Howard, Colo., to Calcite	5.70	
Lascar, Colo., to Cuchara	13.04	
Francisco, Colo., to Tropic	1.95	

Lines Abandoned in United States, Canada and Mexico in 1936—(Continued)

United States	Lines abandoned and taken up Miles	Lines abandoned but not yet taken up Miles
Duluth, Missabe & Northern		
Part of two spurs, Hibbing, Minn.	1.24	
Waldo, Minn., to Rollins	15.01	
Erie		
Near Pavonia, Ohio		2.78
Florida East Coast		
Florida City, Fla., to Key West		125.22
Great Northern		
St. John, N. D., to International Boundary		3.55
Walhalla, N. D., to International Boundary		5.32
Rexford, Mont., to International Boundary		8.88
Hickory Valley		
Endeavor, Pa., to McDonalds	2.49	
Illinois Central		
Unz, Ill., to Tracy	3.70	
Illinois Terminal		
South Danville, Ill., to Georgetown	10.25	
Lake Erie, Franklin & Clarion		
Strattonville, Pa., to Mill Creek		3.20
At Alasace, Pa.		0.96
Lake Superior & Ishpeming		
Chapman, Mich., to Cico	4.35	
Louisiana Southern		
Reggio, La., to Shell Beach	6.50	
Louisville & Nashville		
Hematite, Tenn., to Pond	30.71	
Van Leer, Tenn., to Cumberland Furnace	6.13	
Palmers, Ala., to Bradford		4.39
Mattawana, Ala., to Graystone		1.75
Vinetta, Ala.		1.23
Valley Creek, Ala., to Virginia		2.03
Connelsville Junction, Ala., to Connelsville		1.34
Linton, Ala., to Coaldale		2.84
Helena, Ala., to Paramount		1.56
Chetopa, Ala., to Granlin		3.11
Vulcan, Ala., to Sayre Mines		1.69
Holt Junction, Ala., to Holt		3.11
Abernaut, Ala., to Rock Castle		1.58
Chamblee, Ala., to Caffee Junction		0.74
Caffee Creek Junction, Ala., to Martaban		0.75
Gantts Junction, Ala., to Gantts Quarry		1.67
Manistee & Repton		
Monroeville, Ala., to Frisco City	9.00	
Allene, Ala., to Excel	3.00	
Maryland & Delaware Sea Coast		
Ellendale, Del., to Milton	32.16	
Michigan Central		
Haakwood, Mich., to Afton		12.70
Midland Valley		
Jenks, Okla., to Kiefur	8.60	
Minneapolis & St. Louis		
Spencer, Iowa, to Storm Lake	36.89	
Otho, Iowa, to Berkeley	35.97	
G. & M. Junction, Iowa, to Montezuma	13.64	
St. Benedict, Iowa, to Algona		8.08
Minneapolis, St. Paul & Sault Ste. Marie		
Rice Lake, Wis., to Birchwood	16.58	
Missouri Pacific		
Mound City, Kan., to Blue Mound	12.52	
Ozark Junction, Ark., to Hartman Junction	12.27	
Booneville, Mo., to Versailles	43.47	
Monongahela		
Brier Hill Junction, Pa., to Brier Hill	2.39	
Morgan & Fentress		
Nemo, Tenn., to Obed		18.00
New York & Pennsylvania		
Canisteo, N. Y., to Ceres	57.00	
Northwestern Pacific		
Carlotta, Cal.	0.12	
Christine, Cal., to Albion		25.65
Clearbrook Junction, Cal., to Clearbrook		1.00
Ohio & Morenci		
Berkey, Ohio, to Allen Junction		4.00
Pennsylvania		
Sugar Camp branch, Pa.	2.70	
Beulah branch, Pa.	0.70	
Amesville branch, Pa.	0.32	
Mapleton branch, Pa.	1.26	
Pennsylvania—(*Continued*)		
Big Sandy branch, Pa.	2.41	
Goss Run branch, Pa.	0.94	
Mineral City, Ohio, to Zoarville	1.61	
Guernsey, Ohio, to Kimbolton	8.79	
Brinkhaven, Ohio	1.85	
Warsaw Junction, Ohio, to Brinkhaven	7.04	
Windber, Pa., to Arrow	0.86	
Anita branch, Anita, Pa.	1.39	
Lower Hillville, Pa., to Indian Bend	15.84	
East Brady, Pa.	2.32	
Alverton, Pa.	1.37	
Mt. Pleasant, Pa.	1.19	
Scottdale, Pa.	2.92	
Connellsville, Pa.	2.20	
Thompson, Del., to Landenburg, Pa.		3.44
Manahawken, N. J., to Beach Haven		12.11
Mineral City, Ohio, to Zoarville		3.83
Warsaw Junction, Ohio, to Brinkhaven		12.50
Mayes, Pa., to Ames		3.35
La Jose, Pa., to Ostend		2.47
Hillman, Pa.		3.35
Cush Creek Junction, Pa.		1.53
Unity, Pa.		1.22
Newcomer, Pa., to Ache Junction		2.58
Rainey, Pa.		1.41
Trinway, Ohio, to Tunnel Hill		10.85
Pennsylvania-Reading Seashore Lines		
At various points in New Jersey	10.40	
Pittsburgh & Susquehanna		
Wigton, Pa., to Fernwood	22.02	
Quanah, Acme & Pacific		
Matador Junction, Tex., to Matador	8.08	
St. Joseph Belt		
St. Joseph, Mo.	0.31	
Southern Pacific		
Transfer, Ore., to Cheshire	11.00	
Ilmon, Cal., to Caliente	1.82	
Graham, Cal.	0.70	
Lemoine, Cal.	0.34	
Malvado, Tex., to Watkins	7.20	
Feodora, Tex., to Sanderson	5.90	
Altree, Ore., to Yakina		7.26
The Dalles & Southern		
The Dalles, Ore., to Friend	40.79	
Thornton & Alexandria		
Tensman, Ark., to Hampton		11.68
Trinity Valley Southern		
Dodge, Tex., to Oakhurst		5.90
Tuckerton		
Tuckerton, N. J., to Whitings	28.90	
Union Pacific		
Ainsworth, Ore., to North Junction	71.26	
Valley		
Kushequa, Pa., to Westline	9.41	
Ventura County		
Oxnard, Cal.	0.35	
Petit, Cal.		0.59
Weatherford, Mineral Wells & Northwestern		
Salesville, Tex., to Graford		12.04
Wheeling & Lake Erie		
Carrollton, Ohio, to Sherrodsville		11.87
Total	1,040.16	482.68
Canada		
Brandon, Saskatchewan & Hudson's Bay		
International Boundary to Brandon, Man.		69.50
International Boundary to Morden, Man.		15.22
Canadian National		
Milton Junction, N. S., to Rapid Falls	3.68	
Noyan, P. Q., to Iberville	18.90	
Hickson, Ont., to Tavistock Junction	4.63	
Buton, Ont., to Allimil	1.32	
Carruthers, Sask.	2.47	
Speers, Sask.	0.39	
Foothills, Alta., to Lovett	5.94	
Lake Isle, Alta., to Darson Junction	10.00	
St. Leonard Junction, P. Q., to Nicolet		15.05
S. S. & C. Junction, P. Q., to Farnham		10.95
Rockland, Ont., to Clarence Creek		5.10
Runnac, Ont., to North Oshawa		32.44
Port Perry, Ont., to Cresswell		13.00
Simcoe Junction, Ont., to Brandy Creek		8.01
Burgessville, Ont., to Woodstock		9.05
Tavistock Junction, Ont.		1.68
Peace River Junction, Alta., to Lake Isle		22.10
Ashcroft, B. C.		0.43
Kidd, B. C.		0.71
Canadian Pacific		
International Boundary to Eastman, P. Q.	15.00	
Shore Line Junction, N. B., to Bonny River	28.80	
Cyr Junction, N. B., to Edmundston	27.50	
O'Donnell, Ont., to Turbine	16.40	
Chelmsford, Ont., to Bradley	5.90	
Stobie branch, Ont.	3.40	
West End, B. C., to Archibald	17.40	
Great Northern		
International Boundary to Elko, B. C.		33.75
Total	161.73	236.99
Mexico		
National of Mexico		
Sauceda, Coahuila, to Reata		25.90
Rincon de Romos, Aquascalientes, to Cobre		10.60
Total		36.50

actually a considerable amount of work remains to be done, much of which must be carried out on a schedule of consecutive items. This road has also practically completed the diversion and elevation of its passenger tracks through Syracuse, N. Y., these tracks and the new station having been placed in operation during the year. The Atchison, Topeka & Santa Fe is prosecuting with vigor the extensive line-revision and curve-reduction program which it has undertaken to promote faster passenger schedules between Chicago and points in California. In this connection a number of other roads have similar, though less extensive projects in contemplation.

In Mexico there has been a continuation on a moderate scale of the renewed construction activities which were noted last year. The 24.5-mile line between Barroterán, Coahula, and Muzquiz has been completed. Likewise, a 13-mile line between Empalme and Sebastapol,

Mileage Abandoned 1933 to 1936 inclusive

	1933	1934	1935	1936	Total
Alaska	18.27	....	....	....	18.27
Alabama	28.08	36.22	....	42.09	106.39
Arizona	126.51	15.49	17.04	....	159.04
Arkansas	37.85	51.28	42.35	23.95	155.43
California	185.65	116.00	70.57	30.57	402.79
Colorado	56.57	6.31	84.98	86.30	234.16
Connecticut	....	....	33.93	....	33.93
Delaware	....	....	....	33.16	33.16
Florida	69.59	28.13	1.47	165.22	264.41
Georgia	46.56	126.63	12.34	....	185.53
Idaho	....	4.63	46.78	16.00	67.41
Illinois	38.30	160.82	13.90	32.06	245.08
Indiana	25.66	....	69.70	0.12	95.48
Iowa	79.51	52.44	83.32	208.75	424.02
Kansas	128.97	162.64	236.85	51.33	579.79
Kentucky	74.27	22.89	7.86	....	105.02
Louisiana	35.94	37.48	8.96	6.50	88.88
Maine	13.95	71.39	8.16	....	93.50
Maryland	....	....	25.60	....	25.60
Massachusetts	....	....	33.37	....	33.37
Michigan	51.05	71.39	166.20	40.16	328.80
Minnesota	12.94	53.37	50.93	31.94	149.18
Mississippi	33.50	85.57	....	....	119.07
Missouri	25.51	202.65	118.98	48.47	395.61
Montana	....	....	18.37	10.31	28.68
Nebraska	45.39	4.87	....	....	50.26
Nevada	....	26.27	0.31	....	26.58
New Hampshire	....	5.90	63.92	28.61	98.43
New Jersey	62.58	21.38	....	60.57	144.53
New Mexico	....	41.10	48.02	....	89.12
New York	4.14	30.82	30.58	57.00	122.54
North Carolina	53.10	18.50	10.00	11.39	92.99
North Dakota	....	....	....	16.36	16.36
Ohio	17.81	....	18.77	66.47	103.05
Oklahoma	9.24	79.01	....	8.60	96.85
Oregon	12.31	7.75	13.00	133.17	166.23
Pennsylvania	39.33	77.60	58.64	105.37	280.94
Rhode Island	....	....	....	....	....
South Carolina	....	1.54	76.50	25.00	103.04
South Dakota	....	24.04	26.65	16.43	67.12
Tennessee	39.81	41.23	64.15	64.84	200.03
Texas	187.82	126.13	77.81	39.12	431.88
Utah	3.05	16.19	....	....	19.24
Vermont	33.22	....	....	1.00	34.22
Virginia	51.69	4.80	21.74	....	78.23
Washington	55.86	12.01	88.35	12.69	168.91
West Virginia	77.49	26.08	12.13	21.10	136.80
Wisconsin	93.14	124.45	39.65	38.18	295.42
Wyoming	....	....	41.07	....	41.07
Total	1,875.66	1,995.00	1,842.95	1,522.84	7,236.45

with a branch to serve Tuxtepec in Oaxaca, was completed in 1936, while a 4-mile line revision between Acámbaro, and Uruapan in Michoacan was carried out, to raise the track above flood plane. During the year a new company, known as Lineas Ferreas de Mexico, S.A. de C.V., has been formed to take over all projected lines, those which were not under actual construction and those which do not properly belong in the national system.

Abandonments Again Exceed 1,000 Miles

There was again a decrease in the mileage of lines abandoned, although during the year 1,523 miles of lines were abandoned, this being the fifth successive year and the sixth time that abandonments have exceeded 1,000 miles. This compares with 1,626 miles abandoned in 1921, 1,452 miles in 1932, 1,876 miles in 1933, 1,995 miles in 1934, the maximum of record, and 1,843 miles in 1935, the only years in which abandonments have exceeded 1,000 miles. The total abandonments for 1936 were thus 1,430 miles greater than the mileage of new lines completed during the year. The largest single abandonment was that of the Union Pacific between Ainsworth, Ore., and North Junction, 71 miles. The Colorado & Southern was a close second with 64 miles abandoned between Sullivan, Colo., and Falcon. In third place, the New York & Pennsylvania abandoned 57 miles and thus also stood in first place with respect to the abandonment of an entire railway. The Dalles and Southern, with 41 miles, came second in this category, while the Maryland & Delaware Seacoast was third with 32 miles. The abandonments reported in any year include all lines abandoned permanently during that year, whether the tracks have or have not been taken up, and are not included in the figures in later years when the tracks of the latter lines are actually taken up.

No record of abandonments was kept prior to 1917, because the few lines that were discontinued from time to time were unimportant and usually in sparsely populated territory, generally logging roads and those serving mines, while they occurred so infrequently that they attracted little attention. Beginning with 1917, however, in which year 942 miles were abandoned, abandonments on a large scale have continued ever since, the mileage having ranged from 282 miles in 1927, to 1,995 in 1934. During the 20-year period beginning with 1917, a total of 19,072 miles of lines have been abandoned, while during the same period only 10,286 miles of new lines have been constructed, leaving a net decrease for the period of 8,786 miles of main lines.

Of equal interest with the mileage abandoned by individual roads and the total for all roads, is the distribution of these abandonments by states, for the states themselves are vitally concerned. During the four years ending with 1936, a total of 7,236 miles of lines were abandoned in 47 states and Alaska, Rhode Island being the only state in which no abandonment occurred during this period. For this 4-year period, Kansas heads the list with 580 miles abandoned; Texas is second with 432 miles of lines abandoned; and Iowa ranks third with abandonments aggregating 424 miles. By regions, the abandonments for the four years have been: New England states, 293 miles; North Atlantic states, 581 miles; southeastern states, 1,312 miles; middle western states, 1,968 miles; western states, 714 miles; southwestern states, 892 miles; and Rocky Mountain-Pacific states, 1,128 miles.

Prior to 1932, the abandonments in both Canada and Mexico had been negligible. In 1932 and 1933, however, the Canadian roads abandoned a total of 282 miles. During 1934 there was a still further abandonment of 55 miles, and in 1935 these figures were increased by 125 miles. During 1936, however, the abandonments showed a further increase of 399 miles, the largest of any year of record. No abandonments were recorded for Mexican roads in 1934, although operation was suspended on several small roads serving mining properties, and in some cases operation has not yet been resumed. The abandonments in 1935 amounted to only 4 miles, but during 1936, the total was 36.5 miles, all belonging to the National system.

Miles of Lines Abandoned in the United States Since 1917

1917	942	1927	282
1918	959	1928	512
1919	637	1929	475
1920	536	1930	694
1921	1,626	1931	795
1922	677	1932	1,452
1923	513	1933	1,876
1924	693	1934	1,995
1925	606	1935	1,843
1926	457	1936	1,519

Following is a detailed report by roads of construction projects completed or under way during 1936, the individual cost of which approximates or exceeds $100,000, except grade crossing projects which are included regardless of cost:

Railway Construction in the United States

(Figures in parentheses indicate percentage of completion. In grade crossing elimination, all work is done with federal or state funds unless otherwise indicated.)

Alabama, Tennessee & Northern

Grade Crossing Elimination: Subway: York, Ala., $150,000 (100).

Alaska

Important Work Undertaken: Line diversion, M. P. 53 to M. P. 53.4, $110,000 (100). Replacing wooden bridge with girder spans, M. P. 70.7 (100). Replacing wooden bridge with girder spans, M. P. 86.6 (100). Addition to Curry hotel, Curry (100). Warehouse, Holy Cross (100). Extension to dock, Seward (100). (This general improvement program totaled $250,000.)

Alton

Grade Crossing Elimination: Overcrossings: Lambert, Ill., $62,600 (100); Blodgett, Ill., $62,600 (100); Larrabee, Mo., $30,000 (100); Steinmetz, Mo., $20,100 (100).

Subways: South Joliet, Ill., $181,434 (25); Springfield, Ill., $250,000 (100); Carlinville, Ill., $27,101 (80); Shipman, Ill., $40,683 (100); Pearl, Ill., $31,704 (100); Alma, Mo., $28,074 (80); Higginsville, Mo., $35,000 (100); Independence, Mo., $28,500 (100). Extension of subway, Mexico, Mo., $20,800 (100).

Atchison, Topeka & Santa Fe

Grade Crossing Elimination: Overcrossings: Blodgett, Ill. (100); Stone, Kan. (100); Lebo, Kan. (100); Emporia, Kan. (25); Santa Fe avenue, Chanute, Kan. (50); Lincoln street, Concordia, Kan. (100); Kinsley, Kan. (75); Harper, Kan. (75); Guthrie, Okla. (50); Minnequa, Colo. (100); Albuquerque, N. M. (100); Calwa, Cal. (100); Wilmington, Cal. (100).

Subways: South Chicago street, Joliet, Ill. (20); Mathield Green, Kan. (50); Pueblo, Colo. (100); Central avenue, Albuquerque, N. M. (25); Tijeras road, Albuquerque, N. M. (25); Winslow, Ariz. (100); Peoria, Ariz. (100); Wickenburg, Ariz. (50); Buena Park, Cal. (100); Hobart, Cal. (100); Rivera, Cal. (50).

Relocation of highway: Perea, N. M. (100); Valentine, Ariz. (100).

(Gulf, Colorado & Santa Fe.) Viaduct, Oakland and Merlin streets, Dallas, Tex. (10). Subway, Corinth and Waco streets, Dallas, Tex. (25).

(Panhandle & Santa Fe.) Subway, Alpine, Tex. (50).

New Lines Under Construction: (Elkhart & Santa Fe.) Between Boise City, Okla., and the Oklahoma-Colorado state line, 20.34 miles (to be completed about March 1, 1937). (Dodge City & Cimarron Valley.) Between the Oklahoma-Colorado state line and Las Animas, Colo., 90.56 miles (to be completed about March 1, 1937).

Important Work Undertaken: Line change between La Rose, Ill., and Wilbern (25); between New Boston, Iowa, and Argyle (25); between Gorin, Mo., and Rutledge (25); between Gibbs, Mo., and La Plata (50); between Sibley, Mo., and Atherton (25); near Howell, Kan. (100); between West, Colo., and Thatcher (100); between Dillon, N. M., and Otero (100); between Kennedy, N. M., and Ortiz (100); near Holbrook, Ariz. (100); at Chino, Ariz. (100); and at Haviland, Ariz. (100). Renewal of substructure and extension of Bridge 376-B, near Alston, Okla. (100). Dormitory for employees, Grand Canyon, Ariz. (100).

Atlanta & West Point

Grade Crossing Elimination: Overcrossings: Notasulga, Ala., $35,000 (100); Montgomery, Ala. (100). Relocation of highway, Newnan, Ga. (100).

Atlanta, Birmingham & Coast

Grade Crossing Elimination: Overcrossings: Ideal, Ga., $20,000 (60); Ideal, Ga., $12,281 (100).

Atlantic Coast Line

Grade Crossing Elimination: Overcrossings: Tarboro, N. C., $70,000 (100); Calypso, N. C., $64,389 (100); Spout Springs, N. C., $21,000 (25); Vuie, N. C., $53,000 (30); Wadesboro Junction, N. C., $65,165 (100); Morven, N. C., $81,860 (100); Red Hill, S. C., $30,000 (20); Salters, S. C., $52,000 (100); Moncks Corner, S. C., $42,000 (100); Fort Bull, S. C., $58,000 (100); Hardeeville, S. C., $64,000 (100); Callahan, Fla., $118,900 (100); Mattox, Fla., $106,200 (100); Alachua, Fla., $79,400 (100); Tampa, Fla., $92,000 (100); Dunnellon, Fla., $67,700 (100); Dothan, Ala., $88,200 (100); Troy, Ala., $38,200 (100); Montgomery, Ala., $72,750 (100).

Subways: Collier, Va., Battlefield Memorial Association project, $90,000 (100); Petersburg, Va., $35,000 (100); Halifax, N. C., $48,761 (100); Fayetteville, N. C., $119,249 (100).

Reconstruction of bridges: Richmond, Va., $45,173 (100); Richmond, Va., $32,166 (100); Bonneau, S. C., $67,000 (100); North Charleston, S. C., $90,000 (100); relocation of highway, Laneys, S. C., $90,000 (100).

Baltimore & Ohio

Grade Crossing Elimination: Overcrossings: Franklin street, Washington, D. C., joint with District of Columbia, $200,000 (30); Rockville, Md., $177,000 (85); Michigan avenue, Washington, D. C., $232,000 (65); Eastern avenue, Washington, D. C., $207,000 (80); Newburg, W. Va., $96,000 (10); Thornton, W. Va., $158,000 (10); Hundred, W. Va., $69,000 (90); Bristol, W. Va., $186,500 (65); Edenburg, Pa., $462,000 (80); Zelienople, Pa., $240,000 (85); Ramey, Ohio, $80,000 (45); Norwich, Ohio, $175,000 (20); Lindsay, Pa., $218,200 (20); La Paz, Ind., $133,000 (100); Kimmel, Ind., $107,000 (100).

Subways: New York and West Virginia avenues, Washington, D. C., under Public Act 259, $104,000 (96); Mumford, N. Y., $193,700 (100); Peth, N. Y., $170,200 (100); Kent, Ohio, $240,000 (40); Schenk, Ohio, $210,000 (60); Seymour, Ind., $67,000 (100); (joint with state) Leroy, N. Y., $254,000 (100); West Washington, Pa., $250,000 (30).

Reconstruction of overhead and subway bridges: Elm Grove, W. Va., joint with state, $72,000 (100); Fort Wadsworth, Staten Island, N. Y., $85,000 (92); 3 bridges, Arrochar, S. I., $145,000 (96); Garbutt, N. Y., $26,500 (100); Machias, N. Y., $60,000 (30); Portsmouth, Ohio, $106,500 (10); Chillicothe, Ohio, $164,000 (50). Relocation of highway, Smithburg, W. Va., $154,000 (45).

Track elevation: (Joint with city and state, PWA grant 30 per cent.) Elm Park, Staten Island, N. Y., to Mariners Harbor, $1,824,000 (60); Port Richmond, S. I., to Tower Hill, $1,724,000 (90); Tompkinsville, S. I., to Stapleton, $1,524,000 (100); Fort Wadsworth, S. I., $942,000 (100).

Important Work Undertaken: Freight house and changes in train yard, 26th street and 13th avenue, New York, $240,000 (100). Alterations to pier and installation of heating, Pier 22, New York, $150,000 (10). Relocation of 15 miles of line in connection with the construction of dam across the Tygart river by the federal government, near Grafton, W. Va., $4,384,000 (75). Reconstruction of Bridges 14 and 14A, damaged by flood, Ridgedale, W. Va., $100,000 (100). Relocation of 5.25 miles of C. I. & W. branch and 1.5 miles of C. T. & V. branch, in connection with the Muskingum Watershed Conservancy district pools, Beach City, Ohio, Mineral City and East Sparta, $1,400,000 (50). Freight house and office building, Fourteenth street and Chicago river, Chicago, $356,500 (50).

Bangor & Aroostook

Grade Crossing Elimination: Overcrossings: Phair, Me., $57,000 (100); McShea, Me., $58,000 (100); Dyer Brooke, Me., $75,000 (100); Barretts, Me., $65,000 (100). Subway: Millinocket, Me., $107,000 (100). Relocation of highway: Littleton, Me., to Monticello, $50,000 (100).

Belt Railway of Chicago

Grade Crossing Elimination: Viaduct crossing 18 tracks, Kedzie avenue, Chicago, $500,000 (2).

Birmingham Southern

Grade Crossing Elimination: Overcrossing: Birmingham, Ala., $100,000 (75).

Boston & Maine

Grade Crossing Elimination: Overcrossings: Wells, Me., $55,998 (100); two crossings, Newmarket, N. H., $106,043 (100); Plaistow, N. H., $48,000 (100); Newbury, Mass., $312,000 (85); Ashburnham, Mass., $139,000 (100); Waltham, Mass., $257,000 (100); Worcester, Mass., $362,000 (10); Ayer, Mass., $117,000 (100); Lunenburg, Mass., $77,400 (100).

Subway: Hoosick, N. Y., joint with state, $110,000 (100).

Important Work Undertaken: Reconstruction of 4-span bridge, No. 0.14, Manchester, N. H., $108,000 (100).

Burlington-Rock Island

Grade Crossing Elimination: Overcrossing: Mexia, Tex., $152,000 (100).

Butte, Anaconda & Pacific

First Track: Between Butte, Mont., and Anaconda, 0.06 mile.

Grade Crossing Elimination: Subway: Rocker, Mont., $135,000 (100).

Canadian National (Lines in United States)

Third Track: Belsay, Mich., 0.08 mile.

Grade Crossing Elimination: Overcrossing: Griffith, Ind. (100). Subways: Flint, Mich. (100); Hamtramck, Mich. (100); Thornton Junction, Ill. (100). Reconstruction of subway bridge: Detroit, Mich. (to be completed in 1937).

Important Work Undertaken: Construction of 800 ft. of dock along Detroit river, foundation and floor for warehouse and rearrangement of tracks, Brush Terminal, Detroit, Mich. (100).

Canadian Pacific (Lines in United States)

Grade Crossing Elimination: Overcrossings: Moosehead, Me. (100); Lyndonville, Vt. (100).

Carlton & Coast

First Track: Carlton, Ore., to Cody, 20.72 miles.

Central of Georgia

Grade Crossing Elimination: Overcrossings: Troy, Ala., $42,500 (100); Opelika, Ala., $157,000 (60); Whitesville, Ga., $45,000 (50); Mandeville, Ga., $25,000 (25); Pooler, Ga., $60,000 (5).

Subways: Vincent, Ala., $111,000 (90); Forest Park, Ga., $40,000 (10).

Central of New Jersey

Grade Crossing Elimination: Overcrossings: Roosevelt, N. J., $68,000 (20); Newark, N. J., $400,000 (0). Subways: Central avenue, Westfield, N. J., $500,000 (40); Chatsworth, N. J., $37,000 (100); track elevation to eliminate 13 street and 2 railway crossings, Elizabethport, N. J., $5,000,000 (6).

Important Work Undertaken: New line under survey, Tremley, N. J., to Linden, 2.3 miles. Widening Bridge 201, Ward street, Newark, N. J., to accommodate State Route 21, $200,000 (100). Construction of subway, Cornell boulevard, Raritan, N. J., to accommodate State Route 31, $115,500 (100).

(New York & Long Branch.) Installation of rolling-lift bridge in former fixed span, Big Shark river, Avon-Belmar, N. J., $275,000 (17).

Charleston & Western Carolina

Grade Crossing Elimination: Overcrossings: Sheldon, S. C., $44,000 (100); Woodruff, S. C., $49,000 (100). Subway: Spartanburg, S. C., $38,000 (80).

Chesapeake & Ohio

Grade Crossing Elimination: Overcrossings: Clifton Forge, Va., $161,050 (90); Mier, Ind., $47,000 (100); Highland, Ind., $119,000 (65); Highland, Ind., $64,000 (50); Huntington, W. Va., $125,000 (100).

Subways: Ivy, Va., $109,000 (100); Huntington, W. Va., $180,000 (2); pedestrian subway, Huntington, W. Va., $15,000 (25); Kenova, W. Va., $149,600 (0); Columbus, Ohio, $152,000 (52); two, 5th and King avenues, Columbus, Ohio, $453,558 (3).

Reconstruction of overhead crossings: Newport News, Va., $164,000 (100); Culloden, W. Va., $50,000 (0); Charleston, W. Va., $647,000 (70).

Relocation of highway: Gordonsville, Va., $35,000 (0); Charlottesville,

Va., $35,000 (100); Danville, W. Va., to Madison, $110,000 (5).

Important Work Undertaken: Extension and replacement of stalls in enginehouse, Charlottesville, Va., $100,700 (100). Additions and improvements to hospital, Clifton Forge, Va., $123,000 (100). Enlargement and lining old Lewis tunnel, Jerrys Run, Va., $305,000 (100). Enlargement and lining of portion of Needles Eye tunnel and conversion of remainder into open cut, Aden, Ky., $151,000 (100). Revision of line and retirement of Triplett tunnel, Haldeman, Ky., $444,000 (100). Three traveling towers with chutes, Pier 9, Newport News, Va., $450,000 (85). Raising and riprap ing roadbed and anchoring track, James River line, $10,845 (1). Extension of siding, relocation of water column, new pumping plant and erection of 50,000-gal. tank, B. S. Cabin, Va., $133,643 (15).

Chesapeake Western

Grade Crossing Elimination: Relocation of highway: Penn Laird, Va., $38,000 (100); Montevidio, Va., $30,000 (100).

Chicago & Eastern Illinois

Grade Crossing Elimination: Overcrossing: Dolton, Ill., $210,000 (90). Subways: Clinton, Ind., $74,000 (100); Tuscola, Ill., $90,000 (100); St. Elmo, Ill., $97,000 (100).

Chicago & Illinois Midland

Grade Crossing Elimination: Relocation of highway, Oakford, Ill., $1,072 (100).

Chicago & North Western

Grade Crossing Elimination: Overcrossings: Kickapoo Junction, Ill., $171,000 (100); Peoria, Ill., $300,000 (30); La Crosse county, Wis., $210,000 (90); Lyongs Bridge, Wis., $154,000 (100); Long Lake, Wis. (0); Scranton, Ia., $60,500 (100); Carroll, Ia., $70,300 (100); Dennison, Ia., $31,390 (100); Jewel, Ia., $37,790 (100); Irving, Ia., $26,500 (100); Hubbard, Ia., $27,550 (100); Dakota City, Ia., $36,500 (100); Lake Benton, Minn., $89,475 (100); Iroquois, S. D., $33,650 (100); Bell street, Fremont, Neb., $118,000 (70); Norfolk, Neb., $77,223 (100); Hooper, Neb., $62,273 (100); Orin, Wyo., $89,142 (70); Tilford, S. D., $30,250 (100); Deadwood, S. D., $65,320 (100); Whilewood, S. D., $80,000 (0); Jefferson, Wis., $119,700 (99).

Subways: 63rd, 65th and (pedestrian) 61st streets, Kenosha, Wis., $366,000 (100); Wiscona, Wis., $257,000 (50); Wiscona, Wis., $274,000 (50); (widening) South Chase avenue, Milwaukee, Wis., $432,000 (0); Lake Forest, Ill., $180,000 (60); Lake Forest, Ill., $175,000 (75); Woodstock, Ill., $87,000 (75); (widening) Evanston, Ill., $143,000 (85); Girard, Ill., $20,200 (100); Negaunee, Mich., $205,000 (95); Ishpeming, Mich., $25,000 (95); Nevada, Ia., $35,000 (100); Sanborn, Minn., $47,000 (100); Burchard, Minn., $34,967 (100); Altamont, S. D., $16,950 (100); Rapid City, S. D., $46,815 (75); Blue Earth, Minn., $43,500 (100).

Reconstruction of bridges: Milwaukee, Wis., $67,000 (75); West Allis, Wis., $52,000 (100); Fox Lake, Minn., $32,000 (100).

Important Work Undertaken: Construction of 14-in. transite water line, Chicago to Proviso yard, 6 miles, $260,000 (100).

Chicago & Western Indiana

Grade Crossing Elimination: Subway: Stony Island avenue, Chicago, $226,000 (87).

Chicago, Burlington & Quincy

Second Track: Indianaola Junction, Ia., to Lucas, 4.73 miles, $730,000 (100).

Grade Crossing Elimination: Overcrossings: Edwards, Ill., $96,500 (100); Shabbona, Ill., $113,00 (100); Briar Bluff, Ill., $76,500 (90); Payne, Ia., $50,000 (100); McPherson, Ia., $25,000 (100); Avery, Ia., $30,000 (100); Emerson, Ia., $30,000 (100); Chariton, Ia., $40,000 (50); Francis, Mo., $58,000 (100); St. Joseph, Mo., $50,000 (100); Weston, Mo., $50,000 (10); Bissell, Mo., $75,000 (75); Martinsburg, Mo., $58,000 (50); Heartwell, Neb., $67,400 (100); Aurora, Neb., $73,200 (100); Brunswick, Neb., $12,800 (100); Fremont, Neb., $176,500 (0); Cowley, Wyo., $40,000 (75); Nebraska City, Neb., $97,550 (50); Glendo, Wyo., $60,000 (100); Toluca, Mont., $40,000 (100).

Subways: Bristol, Ill., $102,500 (100); Mendota, Ill., $111,000 (100); Arenzville, Ill., $30,000 (100); Sugar Grove, Ill., $116,000 (2); Creston, Ia., $75,000 (100); New London, Ia., $45,000 (10); Palmyra, Mo., $50,000 (100); Liberty, Mo., $100,000 (100); Custer, S. D., $28,000 (100); Alliance, Neb., $37,000 (10).

Important Work Undertaken: Revision of line and grade, and enlarging bridge openings, southwestern Nebraska and eastern Colorado, $800,000 (100). Construction of warehouse, Peoria, Ill., $155,943 (100). Construction of warehouse, Sioux City, Ia., $90,370 (100). Elimination of curvature between Juniata, Neb., and Kenesaw, $130,000 (100).

Chicago Great Western

Grade Crossing Elimination: Overcrossings: Lombard, Ill., $35,000 (100); Farley, Ia., $15,000 (100); Dunkerton, Ia., $17,000 (100); Maloy, Ia., $14,000 (100); Rowan, Ia., $13,000 (100); Carroll, Ia., $16,000 (100); Fairbault, Minn., $333,000 (5); Des Moines, Ia., $300,000 (30). Subways: Villa Park, Ill., $50,000 (5); Austin, Minn., $150,000 (15).

Chicago, Indianapolis & Louisville

Grade Crossing Elimination: Overcrossings: Lafayette, Ind., $95,558 (100); Putnamville, Ind., $116,674 (60).

Chicago, Milwaukee, St. Paul & Pacific

Grade Crossing Elimination: Overcrossings: Burns City, Ind., $29,000 (100); Bridge Junction, Ind., $30,000 (80); Savanna, Ill., $31,000 (100); Davis Junction, Ill., $138,000 (100); Medary, Wis., $75,000 (60); Waukesha, Wis., $65,000 (100); Mazomanie, Wis., $60,000 (100); Chillicothe, Mo., $50,000 (100); Hawkeye, Ia., $50,000 (100); Green Island, Ia., $40,000 (100); Ruthven, Ia., $90,000 (100); Sheldon, Ia., $60,000 (100); Hull, Ia., $30,000 (100); Richland, Ia., $20,000 (100); Atkins, Ia., $25,000 (100); Bouton, Ia., $50,000 (100); Bassett, Ia., $50,000 (100); McIntosh, S. D., $45,000 (100); Kildron, S. D., $35,000 (100); Roscoe, S. D., $17,500 (100); Tulare, S. D., $55,000 (100); Selby, S. D., $55,000 (100); Aberdeen, S. D., $137,000 (25); Parker, S. D., $50,000 (100); Ortley, S. D., $15,000 (100); Lemmon, N. D., $28,500 (75); White Butte, N. D., $30,000 (25); Gascoyne, N. D., $35,000 (25); Baker, Mont., $50,000 (100); Lewiston, Mont., $45,800 (100); Roundup, Mont., $65,000 (100); Harlowtown, Mont., $40,000 (100); Missoula, Mont., $50,000 (100); Soudan, Mont., $40,000 (100); Vendome, Mont., $40,000 (100); Sinclair, Mont., $37,000 (100); Plummer, Idaho, $53,100 (100); Spirit Lake, Idaho, $43,529 (100); Lind, Wash., $32,000 (100); Bellingham, Wash., $60,000 (80); Black River Junction, Wash., $100,000 (40); Puyallup, Wash., $105,000 (80); McKenna, Wash., $28,000 (100).

Subways: Augusta boulevard, Chicago, $285,000 (75); Forreston, Ill., $60,000 (100); Glenview, Ill., $250,000 (100); Gurnee, Ill., $56,500 (100); pedestrian subway, Oconomowoc, Wis., $20,100 (100); Rawson avenue, Milwaukee, Wis., $150,000 (100); Layton avenue, Milwaukee, Wis., $44,600 (100); Madison, Wis., $58,700 (100); Teutonia avenue, Milwaukee, Wis., $125,300 (100); Stambaugh, Mich., $26,550 (100); Milbourne, Ia., $79,200 (100); Mystic, Ia., $30,000 (100); Sioux City, Ia., $50,000 (10); Spring Grove, Minn., $75,000 (60); Wykoff, Minn., $40,500 (90); Milan, Minn., $54,900 (100); Douglas, Minn., $16,200 (100); Ortonville, Minn., $39,600 (100); Kenyon, Minn., $25,200 (100); Faribault, Minn., $30,000 (100); St. Louis Park, Minn., $102,600 (35); Java Junction, S. D., $20,000 (50); Finlan, Mont., $40,000 (100); Ewan, Wash., $39,600 (80); Ranier, Wash., $19,000 (70).

Reconstruction of overhead and subway bridges: Milwaukee, Wis., $157,940 (100); Milwaukee, Wis., $150,000 (100); Amana, Ia., $15,000 (100); Fayette, Ia., $20,000 (100); Des Moines, Ia., $30,000 (100); Mitchell, S. D., $25,000 (100); Okaton, S. D., $50,000 (0); Ortley, S. D., $25,000 (100); Sioux Falls, S. D., $25,000 (100); Cobden, Mont., $40,000 (0); Lind, Wash., $28,000 (30).

Relocation of highway: Herndon, Ia., to Jamaca, $75,000 (100); Bridgewater, S. D., $80,000 (50); Selby, S. D., to Java, $66,000 (65); Dalkena, Wash., to Cusick, $121,000 (100).

Chicago, Rock Island & Pacific

Grade Crossing Elimination: Overcrossings: Spring Valley, Ill., $107,000 (80); Brittain, Ark., $67,400 (100); Little Rock, Ark., $35,000 (100); Bauxite, Ark., $68,100 (100); Argon, Ia., $50,000 (100); Des Moines, Ia., $60,000 (100); Solon, Ia., $25,000 (100); Sharon, Ia., $75,000 (100); Columbus Junction, Ia., $30,000 (100); Atlantic, Ia., $5,000 (100); Lincoln, Neb., $20,000 (100); Jansen, Neb., $25,000 (100); Fairbury, Neb., $48,000 (100); Kenmoor, Mo., $75,000 (25); Rushville, Mo., $165,000 (25); Clay Center, Kan., $166,000 (100); Norton, Kan., $40,000 (100); Topeka, Kan., $91,500 (100); Merritt, Okla., $60,000 (100); El Reno, Okla., $325,000 (60); Chickasha, Okla., $35,000 (100); Holdenville, Okla., $46,000 (100); Choctaw, Okla., $100,000 (80); Oklahoma City, Okla., $110,000 (80); Irving, Tex., $70,000 (100); Hicks, Tex., $127,000 (90); Ft. Worth, Tex., $59,000 (100).

Subways: Abbott, Ark., $60,000 (100); Livermore, Ia., $35,000 (100); Logan, N. M., $55,600 (100); Santa Rosa, N. M., $36,700 (100); Crest, Mo., $20,000 (100); El Reno, Okla., $63,000 (100); Hill Top, Okla., $30,000 (100); Ringgold, Tex., $35,000 (100); Amarillo, Tex., $250,000 (65).

Reconstruction of bridges: Cermak road, Chicago, $210,000 (25); Waveland, Ark., $35,000 (100); Little Rock, Ark., $30,000 (100); El Dorado, Ark., $50,000 (100); Mt. Zion, Ia., $30,000 (100).

Important Work Undertaken: Addition of 11 stalls to enginehouse, construction of backshop, cinder conveyer and miscellaneous facilities. East Des Moines, Ia., $190,000 (100).

Chicago, St. Paul, Minneapolis & Omaha

Grade Crossing Elimination: Overcrossings: Savage, Minn., $62,000 (75); Mankato, Minn., $33,000 (100); Alton, Ia., $31,300 (100); Sioux City, Ia., $108,600 (10); Emerson, Nev., $82,925 (100); Okland, Neb., $51,772 (100).

Subways: Blue Earth, Minn., $62,800 (75); Cliff avenue, Sioux Falls, S. D., $60,000 (40).

Replacement of overhead bridge: Sioux Falls, S. D., $25,000 (100).

Relocation of highway: Heron Lake, Minn., to Wilder, $72,000 (100); Worthington, Minn., to Brewster, $38,000 (100); Heron Lake, Minn., to Wilder, $7,160 (100); Emerson, Neb., to Nacora, $42,607 (100).

Clinchfield

Grade Crossing Elimination: Reconstruction of underpass and approaches, Routes 64 and 70, $78,000 (100).

Colorado & Southern

Grade Crossing Elimination: Overcrossings: West 8th avenue, Denver, Colo., $550,000 (10); Pueblo, Colo., $150,000 (100); Chugwater, Wyo., $102,598 (100); Dwyer, Wyo., $30,000 (25). Subways: North Federal boulevard, Denver, Colo., $234,000 (100); West 38th avenue, Denver, Colo., $245,000 (5).

(Ft. Worth & Denver City). Overcrossing: Oklaunion, Tex., $92,655 (100). Subways: Decatur, Tex., $55,063 (100); Bowie, Tex., $70,336 (100); Amarillo, Tex., $315,899 (60).

Cumberland & Pennsylvania

Grade Crossing Elimination: Subway, Allegany Grove, Md., $30,000 (100).

Delaware & Hudson

Grade Crossing Elimination: Overcrossing: Ft. Edward, N. Y., $122,000 (40).

Subways: Windsor, N. Y., $335,000 (100); Esperance, N. Y., $100,000 (100).

Reconstruction of bridges: Kingston, Pa., $69,000 (100); Wilkes-Barre, Pa., $472,162 (10); Bainbridge, N. Y., $140,000 (5); Duane, N. Y., $91,000 (40); Duanesburgh, N. Y., $167,000 (100); Schuylerville, N. Y., $83,000 (100).

Important Work Undertaken: Replacement northbound span, Bridge, 102.26, lost in flood, Sidney, N. Y., $124,000 (100).

Delaware, Lackawanna & Western

Grade Crossing Elimination: Overcrossings: Wayland, N. Y. (100); Lincoln Park, N. J. (100); Berkley Heights, N. J. (100); Wharton, N. J. (100). Subways: Syraeuse, N. Y. (75); Glenwood avenue and Oak, Murray, Walnut, Crandall, Charles, Jarvis and Emma streets, Binghamton, N. Y. (75); East Bethany, N. Y. (100); Mt. Pocono, Pa. (100). Reconstruction of overhead crossing: Cortland, N. Y. (100).

Denver & Rio Grande Western

Grade Crossing Elimination: Overcrossings: West 8th avenue, Denver, Colo., $375,000 (25); Snowden, Colo., $85,000 (75); Grand Junction, Colo., $245,000 (100); Cokedale, Colo., $40,000 (40); Provo, Utah, $82,000 (15).

Subways: Texas Creek, Colo., $40,000 (50); Cliff, Colo., $45,000 (50); Helper, Utah, $125,000 (25); Springville, Utah, $100,000 (100); Midvale, Utah, $75,000 (75); Salt Lake City, Utah, $134,000 (75).

Important Work Undertaken: Revision of alinement, Westwater, Colo., $111,000 (100).

Denver & Salt Lake

Grade Crossing Elimination: Overcrossings: Rollinsville, Colo., $90,000 (10); Project 388D, $70,000 (100). Subway: Federal boulevard, Denver, Colo., $250,000 (100).

Important Work Undertaken: Revision of alinement M.P. 90 to M.P. 96, Parshall, Colo.; M.P. 82.5 to 83.2, Sulphur Springs, Colo.; and M.P. 29, Crescent, Colo.; $215,000 (95). New yard tracks, Utah Junction, Colo., $120,000 (100). Extension of sidings, various points, total length 8 miles, $135,000 (100).

Des Moines Union

Grade Crossing Elimination: Overcrossings: West 18th street, Des Moines, Ia., $229,981 (100); South East 14th street, Des Moines, Ia., $294,472 (30).

Detroit Terminal

Grade Crossing Elimination: Subway: Woodward avenue, Detroit, Mich., $350,000 (100).

Detroit, Toledo & Ironton

Grade Crossing Elimination: Overcrossing: Ironton, Ohio, $252,712 (50). Relocation of highway: Thorps, Ohio, $75,902 (100).

Important Work Undertaken: Construction of 8-stall enginehouse and incidental facilities, Flat Rock, Mich., $300,000 (50).

Duluth, Missabe & Northern

First Track: From North Hibbing, Minn., to South Hibbing, 0.98 miles.

Grade Crossing Elimination: Overcrossing: Grand Lake, Minn., $94,000 (35). Subway: Eveleth, Minn., $115,000 (35). Relocation of highway: Wahlstin, Minn., $40,000 (100); Tower, Minn., $4,000 (100).

Important Work Undertaken: Replacing timber approach, Ore Dock No. 2, with steel on concrete foundations, Two Harbors, Mich., $103,700 (100). Relocation of yard tracks, Hull Rust yard, Minn., $150,000 (50).

Duluth, South Shore & Atlantic

Grade Crossing Elimination: Overcrossing: Munsing Junction, Mich., $60,000 (100). Subways: Ewen, Mich., $80,000 (100); Negaunee, Mich., $165,000 (75). Relocation of highway: Keewenaw, Mich., $90,000 (10).

East Broad Top

Grade Crossing Elimination: Relocation of highway: Rockhill Furnace, Pa., $70,000 (100).

Elgin, Joliet & Eastern

Grade Crossing Elimination: Overcrossing: Aurora, Ill., $81,000 (100). Subway: Upton, Ill., $210,000 (30).

Erie

First Track: Near Pavonia, Ohio, 2.66 miles.

Second Track: Near Pavonia, Ohio, 2.66 miles.

Grade Crossing Elimination: Overcrossings: Kearny, N. J. (10); Plauderville, N. J. (100); Wyckoff avenue, Waldwick, N. J. (100); Monsey, N. Y. (50); Wimmers, Pa. (100); Oak, Walnut and Crandall streets, Binghamton, N. Y., joint with state, aided by federal funds (100); Lancaster, N. Y. (100); Tift street, Buffalo, N. Y. (10); Jamestown, N. Y. (90); Greenville, Pa. (100); Youngstown, Ohio (100); Pavonia, Ohio (100); Highland, Ind. (65).

Subways: Singac, N. J. (100); Port Jervis, N. Y., joint with state (60); Murray, Jarvis and Emma streets and Glenwood avenue, Binghamton, N. Y. (100); Endicott, N. Y., joint with state (100); Newark, N. J. (100); Binghamton, N. Y. (100); William and South Ogden streets, Buffalo, N. Y. (100).

Reconstruction of overhead and subway bridges: Nanuet, N. Y. (100); Woodbury, N. Y. (100); Eden Center, N. Y. (100); Olean, N. Y. (100); Saegertown, Pa. (35); Highland, Ind. (45).

Florida East Coast

Grade Crossing Elimination: Overcrossings: Titusville, Fla., $176,000 (100); Oak Hill, Fla., $146,000 (100); Hobe Sound, Fla., $16,000 (100).

Fort Smith & Western

Grade Crossing Elimination: Overcrossing, Coal Creek, Okla. $72,610 (80).

Georgia & Florida

First Track: Kingwood, Ga., to Moultrie, 1.7 miles.

Gold Coast

New Line Projected: Port Orford, Ore., to Leland, 90 miles.

Great Northern

Grade Crossing Elimination: Overcrossings: St. Paul, Minn., $92,285 (100); Minneapolis, Minn., $101,830 (100); Minneapolis, Minn., $91,627 (100); Monticello, Minn., $38,893 (100); Cambridge, Minn., $44,655 (100); Wingate, Minn., $34,565 (100); Big Lake, Minn., $61,483 (100); Brook Park, Minn., $59,890 (100); Red Lake Falls, Minn., $34,640 (100); Clara City, Minn. (0); New London, Minn., $28,287 (100); Paynesville, Minn., $39,811 (100); Cottonwood, Minn., $40,363 (100); Saunders, Wis., $35,333 (100); Doon, Ia., $30,208 (100); Petersburg, N. D., $54,793 (100); Church's Ferry, N. D., $63,157 (100); Casselton, N. D. (0); Surrey, N. D., $41,305 (100); New Rockford, N. D., $23,590 (100); Selz, N. D., $34,742 (100); Hannaford, N. D., $39,757 (100); Glenfield, N. D., $34,523 (100); Minot, N. D. (50); Pillsbury, N. D., $36,024 (100); Arlington, S. D., $21,771 (100); Vienna, S. D., $14,630 (100); South Shore, S. D., $16,830 (100); Chappel, Mont., $208,242 (100); Four Range, Mont., $89,717 (100); Dodson, Mont., $88,729 (100); Helena, Mont., $92,884 (100); Havre, Mont., $89,758 (100); Whitefish, Mont., $124,044 (100); Dover, Idaho, $92,385 (100); Naples, Idaho, $92,907 (100); Skykomish, Wash. (0); Belleville, Wash., $66,871 (100); Seattle, Wash., $104,414 (100); Halford, Wash., $32,987 (100); Klamath Falls, Ore., $168,772 (100); Bieber, Cal., $64,813 (100).

Subways: Atwater, Minn., $95,094 (100); Pipestone, Minn., $61,885 (100); Stanley, N. D., $93,032 (100); Grand Forks, N. D., $151,110 (100); Sioux Falls, S. D., $127,426 (100); Glasgow, Mont., $127,267 (100); Kalispell, Mont., $25,635 (100); Belton, Mont., $101,323 (100); Galena, Wash., $68,355 (100); Ephrata, Wash., $59,833 (100); Wenatchee, Wash., $89,455 (100); Bellingham, Wash., $5,200 (100).

Reconstruction of overhead and subway bridges: Des Lacs, N. D., $19,450 (100); Gerber, Mont., $29,102 (100).

Important Work Undertaken: Extension of snow sheds, concrete and creosoted timber construction, Single-Shot, Mont., $139,400 (100).

Green Bay & Western

Grade Crossing Elimination: Overcrossing, Wisconsin Rapids, Wis., $110,000 (80).

Gulf Coast Lines

Grade Crossing Elimination: Overcrossing: Martha, Tex., $66,700 (100). Subway, Mathis, Tex., $151,200 (100).

(International Great Northern). Overcrossings: Arp, Tex., $85,113 (100); Mertens, Tex., $94,485 (100).

Subways: San Antonio, Tex., $157,359 (10); Ft. Worth, Tex., $66,200 (100); Web, Tex., $81,600 (100); Gause, Tex., $64,800 (100); Milano, Tex., $56,100 (100); Devine, Tex., $93,400 (100); Pearsall, Tex., $100,500 (100); New Brunfels, Tex., $83,100 (100); Austin, Tex., $64,308 (100); Crockett, Tex., $63,450 (100); Austin, Tex., $34,000 (100).

Gulf, Mobile & Northern

Grade Crossing Elimination: Overcrossing, Florenville, La., (50).

Houston Belt & Terminal

Grade Crossing Elimination: Subway, Polk street, Houston, Tex., $68,258 (1).

Illinois Central

Grade Crossing Elimination: Overcrossings: Birmingham, Ala., $94,000 (10); Swift, Ill., $60,000 (100); Freeport, Ill., $67,000 (100); Ft. Dodge, Ia., $30,000 (100); Julien, Ia., $25,000 (100); Rock Rapids, Ia., $35,000 (100); Sioux City, Ia., $17,000 (0); Cedar Falls, Ia., $20,000 (100); Fonda, Ia., $50,000 (15); Ulmer, Ia., $40,000 (15); Bardwell, Ky., $60,000 (100); Futrell, Ky., $70,000 (100); Maxon, Ky., $50,000 (100); Mayfield, Ky., $75,000 (0); Greenwood, La., $45,333 (100); Shreveport, La., $80,000 (80); Lake Cormorant, Miss., $75,000 (100); Batesville, Miss., $111,500 (20); Rolling Fork, Miss., $108,500 (40); Wesson, Miss., $53,500 (100); Barandon, Miss., $23,700 (100); Perkinston, Miss., $75,000 (100); Kosciusko, Miss., $42,500 (0); Starkville, Miss., $40,000 (0); Bentonia, Miss., $55,000 (25); Kelso, Miss., $107,600 (10); Dyersburg, Tenn., $40,000 (0); Jackson, Tenn., $50,000 (15); Memphis, Tenn., $200,000 (0); Basco, Wis., $59,500 (100).

Subways: Decatur, Ill., $100,000 (75); Pinckneyville, Ill., $116,400 (100); Tilden, Ill., $60,000 (100); Mendota, Ill., $67,000 (100); Belleville, Ill., $101,000 (25); Torrence avenue, Chicago, $53,000 (100); Cicero, Ill., $235,000 (25); Eighth street, East St. Louis, Ill., $145,000 (75); Mississippi avenue, East St. Louis, Ill., $195,000 (20); Elmhurst, Ill., $106,000 (0); Pomeroy, Ia., $65,000 (30); Louisville, Ky., $100,000 (0); Fort Knox, Ky., $50,000 (25); Bossier City, La., $200,000 (0); Gulde, Miss., $40,700 (100); Clarksdale, Miss., $150,000 (20); Sioux Falls, S. D., $25,000 (25).

Important Work Undertaken: New dock wall, 1,125 ft. along Chicago river, joint with South Park commission, $230,000 (100).

Illinois Terminal

Grade Crossing Elimination: Subways: McKinley Junction, Ill., $100,000 (100); Cox Crossing, Ill., $150,000 (75). Viaduct; Venice, Ill., $400,000 (10).

Interstate

Grade Crossing Elimination: Relocation of highway: Blackwood, Va., $47,360 (100).

Kansas City Southern

Grade Crossing Elimination: Overcrossings: 23rd street, Kansas City, Mo., $134,000 (80); Kniveton, Kan., $85,000 (100); Howe, Okla., $35,000 (50).

Subways: Siloam Springs, Ark., $54,500 (100); Port Arthur, Tex., $120,000 (80).

Reconstruction of intercity viaduct: Kansas City, Mo., $138,000 (100).

Relocation of highway: Mena, Ark., to Potter, $110,000 (100); Grannis, Ark., to Mineral, $88,000 (100).

Kentucky & Indiana Terminal

Important Work Undertaken: Construction of incline for river terminal, Louisville, Ky., $110,000 (100).

Lake Superior & Ishpeming

Grade Crossing Elimination: Subway: West Ishpeming, Mich., $30,000 (100).

Lehigh & Hudson

Grade Crossing Elimination: Overcrossing: Andover, N. J., $55,683 (100). Relocation of highway: Great Meadows, N. J., $9,325 (100).

Lehigh & New England

Grade Crossing Elimination: Relocation of highway: Tamaqua, Pa., $225,441 (40).

Lehigh Valley

Grade Crossing Elimination: Overcrossings: Alpine, N. Y. (75); West Henrietta, N. Y. (95); Tift street, Buffalo, N. Y. (1); Goodmans, N. J. (100). Subways: William and Ogden streets, Buffalo, N. Y. (100); Geneva, N. Y. (75); Tonawanda, N. Y. (80). Reconstruction of subway bridge: Varnia, N. Y. (100).

Louisiana & Arkansas

Grade Crossing Elimination: Overcrossings: Stamps, Ark., $80,000 (80); McIntyre, La., $198,000 (70); Pineville, La., $85,000 (70).

Louisiana, Arkansas & Texas

Grade Crossing Elimination: Overcrossing: Hughes Springs, Tex., $45,000 (80). Subway: Lassater, Tex., $32,000 (100).

Louisville & Nashville

Grade Crossing Elimination: (Percentage of completion not known). Overcrossings: French Village, Ill., $95,500; Nortonville, Ky., $80,000; Russellville, Ky., $90,000; Cynthiana, Ky., $125,000; Norton, Ky., $50,000; McKee, Ky., $40,000; Ruthann, Ky., $50,000; Pennington, Va., $23,306; Chatsworth, Ga., $55,000; Fairmount, Ga., $44,000; Junta, Ga., $20,000; Etowah, Tenn., $50,000; Benton, Tenn., $40,000; Knoxville, Tenn., $60,000; Columbia, Tenn., $75,000; Paris, Tenn., $70,000; Memphis, Tenn., $272,521; Gallatin, Tenn., $27,445; Vine Hill, Tenn., $100,842.50; Alabama City Ala., $45,500; Bessemer, Ala., $111,840; Thomas, Ala., $75,820; Evergreen, Ala., $143,500; Montgomery, Ala., $20,800; Black Greek, Ala., $35,000; North Montgomery, Ala., $71,000; Parkwood, Ala., $56,760; Milton, Fla., $102,000; Henderson Point, Miss., $211,000; Lee, La., $272,000.

Subways: East St. Louis, Ill., $229,500; Lexington, Ky., $50,000; Newport, Ky., $344,540; Madisonville, Ky., $50,000; White, Ga., $20,000; Brownsville, Tenn., $142,000; Attalla, Ala., $64,120; Mobile, Ala., $214,000; Track elevation, Louisville, Ky., $1,300,000.

Relocation of highway: Hog Jaw, Ky., $30,000.

Maine Central

Grade Crossing Elimination: Overcrossings: Highmoor, Me., (100); Harwards, Me. (100); Freeport, Me. (100); Woolwich, Me. (100); Hallowell, Me. (100); Subway: Lewiston, Me. (100).

Midland Continental

Grade Crossing Elimination: Overcrossing: Spiritwood, N. D., $45,000 (100).

Minneapolis & St. Louis

Grade Crossing Elimination: Overcrossings: Maxon, Ia. (100); Albion, Ia. (100); Eldora, Ia. (100); Eldora, Ia. (100).

Minneapolis, Northfield & Southern

Grade Crossing Elimination: Overcrossings: Golden Valley, Minn., $43,810 (100); Golden Valley, Minn., $27,910 (100).

Minneapolis, St. Paul & Sault Ste. Marie

Grade Crossing Elimination: Overcrossings: Hermansville, Mich., $60,000 (100); Lomira, Wis., $150,000 (100); Cadott, Wis., $70,000 (100); Neenah Belt Line, Wis., $150,000 (100); Crandon, Wis., $75,000 (100); North Neenah, Wis., $100,000 (100); Superior, Wis., $145,000 (100); Copas, Minn., $70,000 (100); Belgrade, Minn., $50,000 (100); Paynesville, Minn., $40,000 (80); St. Paul, Minn., $135,000 (50); Baden, N. D., $40,000 (100); Rogers, N. D., $50,000 (100); Washburn, N. D., $30,000 (100); Carrington, N. D., $70,000 (60).

Subways: Gladstone, Mich., $150,000 (75); Gilman, Wis., $45,000 (100); Stanberry, Wis., $45,000 (100); Neopit, Wis., $45,000 (100); Marshall street, Minneapolis, Minn., $85,000 (100); St. Anthony Boulevard, Minneapolis, Minn., $25,000 (100); East Rice street, St. Paul, Minn., $40,000 (100); Carnelian Junction, Minn., $35,000 (100); Hillhead, S. D., $30,000 (75); Velva, N. D., $200,000 (60); Harvey, N. D., $215,000 (50).

Relocation of highway: Marengo, Wis., $190,000 (10); Tenny, Minn., $15,000 (100); Halma, Minn., $20,000 (100); Stranquist, Minn., $25,000 (100); Karlstad, Minn., $20,000 (100); Orleans, Minn., $70,000 (100); Carrington, N. D., $45,000 (10).

Minnesota Transfer Company

Grade Crossing Elimination: Reconstruct overhead bridge, Como avenue, St. Paul, Minn., $56,166 (100).

Mississippi Central

Grade Crossing Elimination: Relocation of highway: Sumrall, Miss. (2 crossings) (100); Bassfield, Miss., to Carson, 5 miles (2 crossings) (100); Fenwick, Miss. (2 crossings) (100).

Missouri & Arkansas

Grade Crossing Elimination: Overcrossing: Edgemont, Ark., $25,000 (100).

Missouri-Kansas-Texas

Grade Crossing Elimination: Overcrossings: North Jefferson, Mo., $107,300 (90); Calhoun, Mo., $55,236 (100); Eve, Mo., $78,048 (100); Paola, Kan., $70,911 (100); Parsons, Kan., $74,376 (95); Choteau, Okla., $53,006 (100); Eufaula, Okla., $58,910 (100); Wynona, Okla., $69,199 (100); Hominy, Okla., $41,733 (100); Cleveland, Okla., $75,000 (50); Cushing, Okla., $85,860 (25); Oklahoma City, Okla., $76,651 (100); Trail, Okla., $12,408 (100); Rockwall, Tex., $33,938 (100); Muenster, Tex., $96,661 (100).

Subways: Sedalia, Mo., $124,148 (80); Chetopa, Kan., $80,723 (100); Caddo, Okla., $55,730 (95); Ft. Worth, Tex., $37,693 (20); Hillsboro, Tex., $106,000 (30); Temple, Tex., $77,275 (100); Smithville, Tex., $96,186 (90); Burkland, Tex., $75,953 (100); Roosevelt avenue, San Antonio, Tex., $82,650 (80); Nogalitos street, San Antonio, Tex., $120,809 (40); Ringgold, Tex., $106,267 (100).

Relocation of highway: Wynona, Okla., to Hominy, $86,329 (100).

Missouri Pacific

Grade Crossing Elimination: Overcrossings: Gorham, Ill., $65,000 (100); St. Louis, Mo., $537,000 (65); 23rd street, Kansas City, Mo., $591,000 (50); 51st street, Kansas City, Mo., $281,000 (60); 63rd street, Kansas City, Mo., $396,000 (70); Durand, Kan., $72,200 (100); Stilwell, Kan., $128,500 (90); Lindsborg, Kan., $91,500 (100); Willis, Kan., $56,500 (100); Coffeyville, Kan., $143,000 (90); Eureka, Kan., $81,300 (70); Godfrey, Kan., $124,000 (100); Scandia, Kan., $275,000 (20); Verdon, Neb., $74,600 (100); Nebraska City, Neb., $172,000 (40); Inola, Okla., $66,000 (100); Nowata, Okla., $48,000 (50); Corey, La., $117,000 (50); Pollock, La., $125,000 (0); Paragould, Ark., $80,000 (50); Batesville, Ark., $76,500 (80); Russellville, Ark., $61,500 (100); Van Buren, Ark., $133,000 (25); North Little Rock, Ark., $140,000 (30); Bryant, Ark., $50,600 (40); Charleston, Ark., $49,600 (20).

Subways: St. Louis, Mo., $240,000 (80); Sedalia, Mo., $167,000 (40); Paola, Kan., $25,000 (100); Lyndon, Kan., $66,600 (95); Admire, Kan., $62,800 (90); Sallyards, Kan., $43,000 (80); Lincoln, Neb., $42,000 (0); Pueblo, Colo., $155,000 (100); Fulton, Ark., $62,400 (40); Little Rock, Ark., $180,000 (0).

Reconstruction of bridges: St. Louis, Mo., $200,000 (0); Pevely, Mo., $16,000 (90); Intercity viaduct, Kansas City, Mo., $946,000 (100); Lincoln, Neb., $60,500 (0); Yellville, Ark., $35,000 (100); 12th street, Little Rock, Ark., $60,000 (100); 14th street, Little Rock, Ark., $70,000 (100).

Relocation of highway: Garnett, Kan., $221,000 (100); Portland, Ark., $35,000 (100); Smithdale, Ark., $26,400 (100); Vincent, Ark., $25,000 (100); Dumas, Ark., $107,800 (30); Gould, Ark., $122,400 (60); Palarm, Ark., $135,900 (100); Norfolk, Ark., $112,200 (30); McAlmont, Ark., $45,800 (100).

(Missouri-Illinois.) Subway: Sparta, Ill., $48,400 (90).

(Union Railway of Memphis.) Overcrossing: Memphis, Tenn., $150,000 (0). Subways: Florida street, Memphis, Tenn., $270,000 (20); McLean street, Memphis, Tenn., $190,000 (10).

Important Work Undertaken: Reconstruction of south approach, Bridge 83, Benzal, Ark., $327,000 (100). Reconstruction of Bridge 69, Osawatomie, Kan., on new line and grade, $150,000 (100). Revision of alinement, 3.71 miles, Spadra, Ark., $260,000 (100).

Mobile & Ohio

Grade Crossing Elimination: Overcrossings: Montgomery, Ala., $69,200 (100); Centerville, Ala., $40,000 (20); Sucarnochee, Ala., $50,000 (100); Shannon, Miss., $55,000 (100); Jackson, Tenn., $100,000 (25). Subways: Mayhew, Miss., $70,000 (40); Ava, Ill., $37,000 (40). Reconstruction of overcrossing, $18,500 (100).

Nashville, Chattanooga & St. Louis

Grade Crossing Elimination: Overcrossings: Waverly, Tenn., $75,000 (100); Somerville, Tenn., $50,000 (50); Hollow Rock, Tenn., $100,000 (40); Holts, Tenn., $25,000 (30); Kimbro, Tenn., $25,000 (20); Whorleys, Tenn., $75,000 (40). Subways: Florida street, Memphis, Tenn., $35,000 (2); McLean street, Memphis, Tenn., $50,000 (10); Attalla, Ala., $60,000 (80). Reconstruction of bridges: Lookout, Tenn., $90,000 (80). Relocation of highway: Huntingdon, Tenn., $110,000 (80); Sherwood, Tenn., $25,000 (50).

Nevada Northern

Grade Crossing Elimination: Five crossings at grade closed, East Ely, Nev., $40 (100).

New Orleans Public Belt

Third Track: New Orleans, La., 1.78 miles.

New York Central

Grade Crossing Elimination: Overcrossings: 34th street to 11th avenue, New York (railroad bears cost), $5,000,000 (83); 76th to 79th streets, New York, express highway, $1,904,000 (80); 94th to 98th streets, New York (railroad bears cost), $2,642,000 (30); 171st street, High Bridge, N. Y. (30 per cent WPA funds), $195,000 (100); Yonkers, N. Y., $183,000 (25); Carman, N. Y., $283,800 (joint with state) (100); Coldwater, N. Y., $129,600 (joint with state) (100); Crittenden, N. Y. (joint with state), $157,000 (25); Lake Katrine, N. Y., $170,000 (100); Lawrenceville, Pa., $114,400 (100); Newark, N. Y. (joint with state), $185,100 (100); Utica, N. Y. (joint with state), $229,400 (100); Whitesboro, N. Y. (joint with state), $173,200 (25); Treskett road, Cleveland, Ohio, $194,630 (90); Batavia, Mich., $130,194 (100); Hammond, Ind., $622,000 (85); Highlands, Ind., $126,000 (75); South Bend, Ind., $69,100 (75).

Subways: Yonkers, N. Y., $126,700 (100); Syracuse, N. Y., South Geddes street, $517,000 (75); track elevation, Syracuse, N. Y., $18,000,000 (railroad bears cost) (98); Delta, Ohio, $152,432 (98); Geneva, Ohio, $429,000 (20); Cleveland, Ohio, $71,000 (10); Bucyrus, Ohio, $87,000 (10); Cedar Grove, W. Va., $24,000 (10); Otis, Ind., $80,000 (95); Monroeville, Ohio, $83,500 (100).

Reconstruction of bridges: Hudson, Mich., $90,344 (100); Athens, Ohio, $60,900 (15); Cermak road, Chicago, $210,000 (25). Relocation of highway: Smithers, W. Va. (2 crossings abolished), $153,000 (15).

(Michigan Central.) Overcrossings: Benton Harbor, Mich., $175,000 (100). Subways: Chelsea, Mich. (2 bridges), $120,000 (100); Hamtramck, Mich., $325,000 (100); Kalamazoo, Mich., $457,000 (20); South Bend, Ind., $169,000 (60). Reconstruction of bridges: Battle Creek, Mich., $115,000 (100); Livernois avenue, Detroit, Mich., $580,000 (65); Grand River avenue, Detroit, Mich., $305,000 (35); Dearborn, Mich., $229,000 (10).

(Cleveland, Cincinnati, Chicago & St. Louis.) Overcrossings: Indianapolis, Ind., $40,000 (100); Shelbyville, Ill., $53,000 (100); Mt. Carmel, Ill., $60,300 (100). Subways: Muncie, Ind., $220,000 (50); Edwardsville, Ill., $130,000 (50). Reconstruction of subway bridge: New Castle, Ind., $60,000 (90).

(Boston & Albany.) Overcrossings: Westboro, Mass., $100,000 (20); North Grafton, Mass. (including pedestrian subway), $130,000 (10); Huntington, Mass., $387,633 (0); Medford, Mass., $100,000 (0); Hudson, N. Y., $115,000 (100).

(Chicago River & Indiana.) Viaduct, Pershing road, Chicago, $290,000 (5).

(Pittsburgh & Lake Erie.) Overcrossing: Monaca, Pa., $110,000 (5). Bridge over three railroads and Mahoning river, Edenburg, Pa., $462,000 (100).

(Rutland.) Overcrossings: North Dorset, Vt., $75,000 (100); Wallingford, Vt., $101,000 (20). Reconstruction of bridges: Proctor, Vt., $15,400 (100); Malone, N. Y., $75,000 (60). Marginal highway, North Bennington, Vt., $32,300 (100).

Important Work Undertaken: Relocation of water mains in 10th and 12th avenues, 29th to 36th streets, New York, $175,000 (100). Superstructure, express highway, structure No. 4, $1,500,000 (100). Covering over track, West 79th street to St. Clair place, except 94th to 98th streets, structure No. 5, $9,074,800 (19). Reconstruction of bridges: 729-A, Batavia, N. Y., $190,000 (95); W-504, Fairport, N. Y., $154,000 (100); 164-A, Potsdam, N. Y., $100,000 (85); 345, Rensselaer, N. Y., $518,700 (100); A-20, Sennett, N. Y., $150,000 (100); 130, West Park, N. Y., $175,000 (95). Scrap and reclamation plant, Ashtabula, Ohio, $165,000 (100).

New York, Chicago & St. Louis

Grade Crossing Elimination: Overcrossings: Tift street, Buffalo, N. Y., $33,000 (5); Claypool, Ind., $76,500 (100). Subways: Angola, N. Y., $91,666 (100); Bay View, N. Y. (joint with state), $43,581 (5); Bellvue, Ohio, $210,510 (5); Charleston, Ill., $30,672 (100); Stony Island avenue, Chicago, $138,084 (100); Peru, Ind., $40,000 (100); 95th street, Chicago, $63,307 (100); Noblesville, Ind., $37,524 (100); Muncie, Ind., $97,168 (40); Crayton, Pa., $141,590 (75); Lima, Ohio, $27,500 (5); Muncie, Ind. (railroad bears cost), $11,730 (100).

New York, New Haven & Hartford

Grade Crossing Elimination: Overcrossings: Ashley Falls, Mass., $120,000 (100); Canton, Mass., $135,000 (30); Sharon, Mass., $195,000 (75); Mansfield, Mass. (includes pedestrian subway), $100,000 (50); West Mansfield, Mass., $95,000 (70); South Weymouth, Mass., $150,000 (100); Quincy, Mass., $350,000 (85); Andover, Conn., $100,000 (90); Canaan, Conn., $100,000 (5); Fairfield, Conn., $314,100 (10); North Haven, Conn., $200,000 (15); Bradford, R. I., $120,000 (100); Davisville, R. I., $95,000 (80); Kingston, R. I., $125,000 (100); Slocums, R. I., $80,000 (100); Hopewell Junction, N. Y. (joint with state), $140,000 (100).

Subways: Port Chester, N. Y., $230,000 (40); Foxboro, Mass., $100,000 (25); Hartford, Conn., $350,000 (25). Reconstruction of bridges: Sharon Heights, Mass. (including pedestrian subway), $90,000 (15); Attleboro, Mass., $133,000 (10); Groton, Conn., $75,000 (100); Providence, R. I., $280,000 (100); Carolina, R. I., $22,000 (25). Relocation of highway: Braintree, Mass., $12,000 (100); Simsbury, Conn., $100,000 (35).

Important Work Undertaken: Steam generating unit, in power house, Cos Cob, Conn., $122,570 (100). Changes in tracks, signals, platforms, etc., in connection with drawbridge across Cape Cod canal, Buzzards Bay, Mass., $155,000 (100). Replacing of slip switches with crossovers to consolidate three interlockings, Readville, Mass., $170,000 (100). Construction of building and tracks for tenant, Roxbury, Mass., $327,300 (50).

New York, Ontario & Western

Grade Crossing Elimination: Overcrossing: Meadowbrook, N. Y., $120,200 (100). Reconstruction and relocation of overcrossing, Rock Tavern, N. Y., $80,200 (100).

Norfolk & Western

First Track: Extension of Buchanan branch, Grundy, Va., 12.77 miles. Construction of Dismal Creek branch, from mouth of Dismal Creek near Grundy, Va., 22.99 miles.

Grade Crossing Elimination: Overcrossings: St. Clair, Va., $68,000 (100); Gaylord, Va., $62,000 (100); Rileyville, Va., $35,000 (100); Grosclose, Va., $70,000 (100); Lynchburg, Va., $22,000 (100); Forest, Va., $35,000 (100); Lynchburg, Va., $40,000 (100); Petersburg, Va., $44,000 (100); Bluefield, W. Va., $159,521 (50); Eckman, Va., $140,141 (5); Ironton, Ohio, $170,000 (25); Afton, Ohio, $85,000 (100).

Subways: Kilby, Va., $55,000 (100); Wytheville, Va., $40,000 (100); Abingdon, Va., $100,000 (50); Suffolk, Va., $100,000 (10); Rosboro, Va., $47,750 (100); Durham, N. C., $50,000 (100); Fieldale, Va., $100,000 (10). Relocation of highway: Starkey, Va., $6,000 (100); Briggs Siding, Va., $4,500 (100); Boones Mill, Va., $11,000 (100).

Important Work Undertaken: Addition to yard, Thomas, Va., $245,000 (100). Addition to yard, Hurley, Va., $125,000 (100). Addition to yard, Roanoke, Va., $300,000 (100). Spur off Buchanan branch, 1.7 miles, $200,000 (100). Spur from Dismal Creek branch, 2.5 miles, $240,000 (100). Increase in yard facilities, Williamson, W. Va., $130,000 (100).

Norfolk Southern

Grade Crossing Elimination: Revision of alinement to eliminate grade crossing, Plymouth, N. C., $40,000 (40). Overcrossings: Mumford street, Raleigh, N. C., $48,000 (100); Raleigh, N. C., $21,000 (100); Varina, N. C., $28,000 (100); McCullers, N. C., $12,000 (100); Duncan, N. C., $17,000 (75); Corinth, N. C., $18,000 (85); Hickory Grove, N. C., $18,000 (85); Stanfield, N. C., $18,000 (85); Charlotte, N. C., $40,000 (75); Biscoe, N. C., $100,000 (0). Subways: Greenville, N. C., $115,000 (90); Raleigh, N. C., $87,000 (75). Relocation of highway: Marsden, N. C., $50,000 (100).

Northern Pacific

Grade Crossing Elimination: Overcrossings: Big Lake, Minn., $85,000 (100); Glenwood, Minn., $40,500 (100); Brainerd, Minn., $81,500 (100); Belfield, N. D., $39,300 (100); East Helena, Mont., $52,500 (100); Mossmain, Mont., $92,300 (100); Bozeman, Mont., $92,300 (100); Billings, Mont., $79,500 (100); Butte, Mont., $6,000 (100); Dufort, Idaho, $35,000 (100); Joel, Idaho, $70,000 (100); Rathdrum, Idaho, $75,000 (100); Centralia, Wash., $119,737 (60); Union avenue, Tacoma, Wash., $123,008 (35); River street, Tacoma, Wash., $220,000 (1); West Dravus street, Seattle, Wash., $112,241 (100); 1st avenue, South, Seattle, Wash., $593,847 (100); Parkwater, Wash., $140,492 (100); Black River Junction, Wash., $143,829 (40); Wallace, Wash., $47,265 (100); Pasco, Wash., $47,610 (100); Pendleton, Ore., $232,000 (50).

Subways: Wrenshall, Minn., $52,500 (100); St. Paul, Minn, $63,900 (100); Manitoba Junction, Minn., $47,000 (100); Dickinson, N. D., $215,000 (80); Mandan, N. D., $43,700 (100); West Fargo, N. D., $80,000 (100); Fargo, N. D., $90,000 (100); Big Timber, Mont., $60,000 (40); Butte, Mont., $194,000 (100); Laurel, Mont., $93,400 (100); Sand Point, Idaho, $35,000 (5); Spalding, Idaho, $10,000 (100); Pasco, Wash., $271,658 (20); Nisqually, Wash., $121,484 (90); Nisqually, Wash., $85,000 (100).

Oregon, California & Eastern

Grade Crossing Elimination: Subways: Olene, Ore., $21,200 (100); Dairy, Ore., $25,000 (100).

Oregon, Pacific & Eastern

New Line Projected: Walden, Ore., to Mosby, 3 miles.

Pennsylvania

First Track: Mineral City, Ohio, to Zoarville, 5.62 miles. Guernsey, Ohio, to Kimbolton, 3.51 miles. At Brinkhaven, Ohio, 1.79 miles.

Grade Crossing Elimination: Overcrossings: Colonia, N. J. (5); York, Pa., 2 crossings (100); Southport, N. Y. (100); Newark, Del. (100); Harman, Md. (100); Lindsey, Pa. (30); Padebaugh, Pa. (100); Kittanning, Pa. (10); Genesee Junction, N. Y. (100); Tift street, Buffalo, N. Y. (5); Spring Mill, Ohio (100); Bedford, Ohio (100); Edenburg, Pa. (100); Greenville, Pa. (100); Jewett, Ohio (100); Bridgeport, Ind. (100); Indianapolis, Ind. (100); Terre Haute, Ind. (100); Mier, Ind. (100); Gary, Ind. (65); Hamlet, Ind. (65); Fosters, Ohio (15); Cadillac, Mich. (100).

Subways: Rahway, N. J. (5); Meluthen, N. J. (15); Iselin, N. J. (10); Avenel, N. J. (10); Darlington, Pa. (100); Edgewood, Md. (10); Larimer, Pa., including pedestrian subway (100); Angola, N. Y. (100); Portville, N. Y. (100); Sonvea, N. Y. (95); Franklinville, N. Y. (100); Panama, N. Y. (100); Blasdell, N. Y. (3); Scottsville, N. Y. (1); Ft. Wayne, Ind. (50); Bellvue, Ohio (15); Walbridge, Ohio (30); Columbus, Ohio (50); Bucyrus, Ohio (15); Altamont, Ill. (100); East St. Louis, Ill. (5); Lincoln Park, Mich. (100); Washington, D. C. (100).

Reconstruction of bridges: Cresson, Pa. (100); Cassandra, Pa. (100); Penn, Pa. (90); Plainfield, Ind. (100); Harmony, Ind. (100); Jeffersonville, Ind. (100); Penford, Mich. (100).

Relocation of highway: Colonia, N. J. (5); Salunga, Pa., including new subway (25); Mills Creek, Pa. (100); Boyd, Pa., 3 crossings (100); Carlisle, Pa., 12 crossings closed (75); Oakington, Md. (100); Freedom, Pa., 2 crossings (2); Delphos, Ohio (100).

Crossings vacated: Woodbine, Pa. (100); Florin, Pa., two crossings (100); Canton, Pa. (100); Magnolia, Md. (100); Harewood Park, Md. (100).

Approximate cost of foregoing projects, $9,780,000, of which $9,010,000 was paid by state or federal funds and $770,000 by railroad.

Important Work Undertaken: Track elevation, new station, three bridges over Passaic river and additional tracks, Newark, N. J. (85). Additional equipment and improvements to mail handling facilities, general post office, Pennsylvania station, New York (100). Tracks and yard facilities to serve General Motors Corporation, Linden, N. J. (70). Philadelphia Terminal improvements, Philadelphia, Pa. (88). New line and other improvements through Baltimore, Md. (88—remainder deferred temporarily). Track elevation, Elmira, N. Y. (100). Reconstruction of undergrade bridge, Crum Lyne, Pa. (100). Reconstruction of two overhead bridges, Earnest, Pa. (100). New industrial track, Washington, D. C. (100). Subway, West Virginia avenue, Washington, D. C. (100). Reinforced concrete invert, Virginia avenue tunnel, Washington, D. C. (100). Reconstruction of A. & S. branch and application of rip rap protection to roadbed, Columbia, Pa. (100). Reconstruction, Washington Pike bridge, Winans, Md. (5). Renewal of catenary structure and replacement of wood stick with porcelain insulators, Philadelphia, Pa., to Paoli (100). Rail to river transfer facilities, Baden, Pa. (99). Warehouse, Pittsburgh, Pa. (100). Reconstruction of two bridges, Silver Creek, N. Y. (1). Renewal of bridge over Olentangy river, Columbus, Ohio (100).

Approximate cost of foregoing projects, $112,654,000.

Pere Marquette

Grade Crossing Elimination: Overcrossings: Lansing, Mich., $170,000 (100); Grandville, Mich., $150,000 (100). Subways: Highland, Mich., $90,000 (100); Saginaw, Mich., $260,000 (100); Plymouth, Mich., $170,000 (100); Detroit, Mich., $220,000 (100). Relocation of highway: Betely, Mich., $81,250 (100); Acme, Mich., $76,800 (100); Clare, Mich., to Farwell, $42,225 (100); Dunning, Mich., $16,800 (100).

Reading

Grade Crossing Elimination: Overcrossings: Bethayres, Pa., work involves two crossings and the reconstruction of overcrossing at Valley Falls, Pa., $462,041 (40). Subways: Mooresburg, Pa., $78,895 (100); Pennington, N. J., $105,828 (20). Reconstruction of bridge: Oak Lane, Pa., $128,728 (100). Relocation of highway: Trackville, Pa., $310,961 (60); Ephrata, Pa., $141,033 (100).

Richmond, Fredricksburg & Potomac

Grade Crossing Elimination: Overcrossing: Greendale, Va., $60,000 (100).

Important Work Undertaken: New storehouse, addition to machine shop, improvements to power plant and relocation of boiler shop, Richmond, Va., $135,000 (40).

St. Louis & O'Fallon

Grade Crossing Elimination: Overcrossing: French Village, Ill. (90).

St. Louis-San Francisco

Grade Crossing Elimination: Overcrossings: Fayetteville, Ark., $25,000 (100); Fulton, Kan., $55,000 (100); St. Louis, Mo., $319,141 (100); Butterfield, Mo., $47,342 (100); Globe, Mo., $54,562 (100); Lilbourn, Mo., $69,500 (100); Sarcoxie, Mo., $66,729 (100); Willow Springs, Mo., $55,990 (100); Afton, Okla., $66,000 (100); Clinton, Okla., $50,000 (100); Caston, Okla., $60,000 (100); Miami, Okla., $61,000 (100); Woodville, Okla., $56,000 (100); Irving, Tex., $105,000 (100); Mercury, Tex., $73,000 (100); Kansas City, Mo., $1,221,332 (100); 23rd street, Kansas City, Mo., $590,924 (75); 51st street, Kansas City, Mo., $280,064 (75); 63rd street, Kansas City, Mo., $395,438 (75); Carthage, Mo., $73,069 (100); Imboden, Ark., $160,000 (75); Jonesboro, Ark., $150,000 (75); Merriam, Kan., $105,000 (100); Godfrey, Kan., $70,000 (100); Paola, Kan., $100,000 (100); Bessemer, Ala., $140,000 (100); East Thomas, Ala., $60,000 (100); Okmulgee, Okla., $125,000 (30); Tahlequah, Okla., $50,000 (100); West Pensacola, Fla., $95,000 (50); Brownwood, Tex., $90,000 (100); Ft. Worth, Tex., $196,000 (50).

Subways: Fayetteville, Ark., $34,146 (100); Beaumont, Kan., $70,000 (100); Birmingham, Ala., $100,000 (100); East Thomas, Ala., $290,000 (100); Memphis, Tenn., $247,500 (25); Shea, Okla., $80,000 (100); Manitou, Okla., $40,000 (100); Paris, Tex., $85,000 (100); Dorchester, Tex., $46,000 (100).

Seaboard Air Line

Grade Crossing Elimination: Overcrossings: Chester, Va. (100); Carrsville, Va. (75); Lilesville, N. C. (100); Sanford, N. C. (100); Dover Mills, N. C. (100); Charlotte, N. C. (100); Nitrolee, S. C. (100); Pritchards, S. C. (100); Columbia, S. C. (100); Camden, S. C. (100); Weddell, S. C. (100); Rains, S. C. (100); Hyatts, S. C. (100); Kittredge, S. C. (100); Sanderson, Fla. (100); Ellaville, Fla. (100); Alachua, Fla. (100); Zephyrhills, Fla. (100); Shady Rest, Fla. (100); West Frostproof, Fla. (100); South Tampa, Fla. (90); West Palm Beach, Fla. (50); Brooksville, Fla. (85); Bartow, Fla. (80); Dallas, Ga. (100); Montgomery, Ala. (35).

Subways: Hamlet, N. C. (100); Sanford, N. C. (100); Cary, N. C. (95); Wake Forest, N. C. (100); Hamlet, N. C. (80); Henderson, N. C. (60); Chester, S. C. (100); Fulton, S. C. (100); Birmingham, Ala. (100).

Sioux City Terminal

Grade Crossing Elimination: Relocation of U. S. Route 20 and construction of viaduct, Sioux City, Iowa, $783,000 (30).

Southern Pacific

First Track: At Idanha, Ore., 0.13 mile. Ilmon, Cal., to Caliente, 1.74 miles. Graham, Cal., 0.70 mile. Lemoine, Cal., 0.36 mile. Feodora, Tex., to Sanderson, 6.60 miles. Malvado, Tex., to Watkins, 7.0 miles.

Grade Crossing Elimination: Overcrossings: Tracy, Cal., $255,101 (100); El Cerrito, Cal., $281,652 (100); Sacramento, Cal., $175,000 (40); Klamath Falls, Ore., $36,709 (100); Hot Springs, Utah, $92,774 (60); Eugene, Ore., $81,604 (100); Roseberg, Ore., $40,000 (100); Oregon City,

Ore., $338,000 (80); Portland, Ore., $411,449 (75); Indio, Cal., $109,612 (100); Figueroa street, including bridge over Los Angeles river, Los Angeles, Cal., $690,174 (65); Soto street, Los Angeles, Cal., $139,926 (100); Beaumont, Cal., $62,677 (100); Normal Junction, Ariz., $50,000 (30); Cochize, Ariz., $51,065 (100); Coldwater, Ariz., including revision of alinement, $228,825 (100); Fairbank, Ariz., $63,832 (100); Stark, Ariz., $50,000 (100); Rodeo, N. M., $73,400 (100); Vaughn, N. M., $45,000 (100); Tularosa, N. M., $56,000 (100).

Subways: Niles, Cal., highway relocation creating six subways, $468,432 (60); Stockton, Cal., railroad assumed superstructure, $326,374 (100); Oakland, Cal., $186,631 (75); Red Bluff, Cal., superstructure by railroad, $127,280 (100); Wall Creek, Ore., $188,941 (100); Reno, Nev., $169,270 (100); Salem, Ore., $328,544 (95); Aurora, Ore., $173,628 (80); Soledad, Cal., superstructure by railroad, $207,812 (100); Salinas, Cal., superstructure by railroad, $303,900 (100); Embarcadero, Cal., superstructure by railroad, $169,379 (100); Santa Clara, Cal., superstructure by railroad, $212,610 (100); San Jose, Cal., $91,289 (100); Famosa, Cal., superstructure by railroad, $339,491 (100); Tempe, Ariz., $75,000 (0); Douglas, Ariz., $134,000 (100); El Paso, Tex., $123,000 (100); Deming, N. M., railroad portion, $100,000 (5); Santa Rosa, N. M., $39,195 (100); Sacramento, Cal., $51,158 (100); Reno, Nev., $118,483 (100).

Reconstruction of bridges: Fernley, Nev., $41,223 (100); Winnemucca, Nev., $45,667 (100); Santa Barbara, Cal., $15,827 (100); Army street, San Francisco, Cal., $81,260 (100); William avenue, San Francisco, Cal., $38,113 (100).

Important Work Undertaken: Revision of alinement to raise roadbed and reduce curvature, Caliente Creek canyon, Caliente, Cal., $248,000 (100). Renewal of seven through truss spans with 14 deck girders, total length 1,260 ft., over Santa Maria river, Guadalupe, Cal., $205,000 (100). Line change to avoid flow of boulders and volcanic ash from glaciers on Mt. Shasta, Graham, Cal., $101,000 (100). Renewal of 533 ft. of bridge over Yuba river, Marysville, Cal., $96,000 (100). Facilities for charging air-conditioning batteries, at various points, $100,000 (100).

(Lines in Louisiana and Texas.) *Grade Crossing Elimination:* Overcrossings: Skidmore, Tex., $131,853 (35); Nacoghoches, Tex., $51,966 (100); Joaquin, Tex., $91,554 (100); Midlothian, Tex., $90,603 (100); Mexia, Tex., $152,197 (100); Ft. Worth, Tex., $256,566 (60); Rayne, La., $145,000 (60); Iowa Junction, La., $115,000 (80); Lake Charles, La., $111,000 (15).

Subways: Mathis, Tex., $151,191 (100); Goliad, Tex., $69,475 (90); Houston, Tex., $80,733 (90); Fay, Tex., $59,572 (100); Caldwell, Tex., $68,085 (100); Bryan, Tex., $54,903 (100); San Antonio, Tex., $168,677 (60); San Antonio, Tex., $266,519 (60); San Antonio, Tex., $117,589 (60); Kaufman, Tex., $54,133 (100); Yoakum, Tex., $184,271 (50); East Dallas, Tex., $97,884 (100); Reklaw, Tex., $57,388 (100); Houston, Tex., $71,350 (100); Houston, Tex., $157,619 (40); Ft. Worth, Tex., $160,964 (30); Brenham, Tex., $69,362 (100); Paige, Tex., $100,328 (25).

Important Work Undertaken: Replacement of Nueces River bridge, Hacienda, Tex., $155,873 (100). Revision of alinement and grade to raise roadbed above flood plane, to reduce curvature, and to eliminate 12 bridges over Sanderson and Thurston Creeks, Sanderson Canyon, Malvado, Tex., to Watkins and Feodora, Tex., to Sanderson, $500,580 (100).

Spokane, International

Grade Crossing Elimination: Overcrossings: Garwood, Idaho (100); Dover, Idaho (50).

Spokane, Portland & Seattle

Grade Crossing Elimination: Overcrossings: South Cheney, Wash., $40,000 (100); Cooks East, Wash., $12,000 (100). Subways: Bend, Ore., $76,500 (100); Linnton, Ore., $42,500 (100); Metzger, Ore., $16,500 (100).

Tennessee

Grade Crossing Elimination: Vacation of six grade crossings, Campbell and Anderson counties, Tenn., $2,500 (100).

Terminal Railroad Association

Grade Crossing Elimination: Overcrossing: Broadway, Venice, Ill., $425,000 (5).

Texas & Pacific

Grade Crossing Elimination: Overcrossings: Grand Cane, La., $125,000 (20); Shreveport, La., $158,000 (10); Greenwood, La., $100,000 (15); Ida, La., $4,200 (100); Bivins, Tex., $3,750 (100); Marshall, Tex., $57,600 (100); Ft. Worth, Tex., $150,500 (100); Daggett street, Ft. Worth, Tex., $214,000 (25); Big Spring, Tex., $25,300 (100).

Subways: Marshall, Tex., $71,200 (100); Annona, Tex., $90,800 (100); Bells, Tex., $43,400 (100); Ft. Worth, Tex., $43,000 (60); Preble, Tex., $116,500 (70); Brazos, Tex., $60,000 (60); Pine street, Abilene, Tex., $50,000 (100); Cedar street, Abilene, Tex., $50,000 (100).

Toledo Terminal

Grade Crossing Elimination: Overcrossing: Toledo, Ohio, $50,000 (100).

Union Pacific

First Track: Bonneville, Ore., in connection with Bonneville dam, 3.95 miles.

Grade Crossing Elimination: Overcrossings: Waterloo, Neb., $100,000 (100); Fremont, Neb., $220,000 (10); North Platte, Neb., $115,000 (10); Chappell, Neb., $70,000 (100); Hastings, Neb., $115,000 (100); Fairbury, Neb., $50,000 (100); Topeka, Kan., $683,000 (100); Manhattan, Kan., $500,000 (25); Lindsborg, Kan., $91,000 (100); Kit Carson, Colo., $90,000 (100); LaSalle, Colo., $90,000 (100); Laramie, Wyo., $116,000 (100); Garfield, Utah, $100,000 (15); Wanship, Utah, $20,000 (100); Delta, Utah, $75,000 (100); Provo, Utah, $164,000 (20); Soda Springs, Idaho, $56,000 (100); McCammon, Idaho, $185,000 (100); Igo, Idaho, $78,000 (100); American Falls, Idaho, $40,000 (100); Bliss, Idaho, $67,000 (100); Bickel, Idaho, $88,000 (100); Zenda, Idaho, $80,000 (100); Monida, Idaho, $90,000 (100); Plummer, Idaho, $106,000 (100); Dillon, Mont., $45,000 (100); Portland, Ore., $80,000 (100); Portland, Ore., $89,000 (100); Big Eddy, Ore., $157,000 (100); Biggs, Ore., $71,000 (100); Pendleton, Ore., $180,000 (50); Madras, Ore., $57,000 (100); Seattle, Wash., $582,000 (95); Black River Junction, Wash., $100,000 (30); Hughes Spur, Wash., $100,000 (25).

Subways: Lawrence, Kan., $310,000 (25); Paradise, Kan., $48,000 (100); Green River, Wyo., $254,000 (35); Granger, Wyo., $98,000 (100); Evanston, Wyo., $229,000 (50); Midvale, Utah, $107,000 (100); Brigham, Utah, $94,000 (90); Pleasant Grove, Utah, $80,000 (60); Mountain Home, Idaho, $125,000 (15); Nampa, Idaho, $175,000 (100); Buckley road, Portland, Ore., $74,000 (100); Baker road, Portland, Ore., $52,000 (100); LaGrande, Ore., $100,000 (100); Redlin, Wash., $25,000 (100); Los Angeles, Cal., $237,000 (100); Las Vegas, Nev., $150,000 (43). Reconstruction of intercity viaduct: Kansas City, Kan., $413,000 (100).

Important Work Undertaken: New machine and erecting shop and incidental facilities, North Platte, Neb., $270,000 (100). Hotel and lodge, capacity 250, warm spring swimming pool, ski lifts and other provisions for winter sports, Sun Valley lodge, Ketchum, Idaho, $1,000,000 (100).

Virginian

Grade Crossing Elimination: Overcrossings: Roanoke, Va., $241,700 (100); Mullens, W. Va., $78,600 (40); Harper, W. Va., $112,600 (50).

Wabash

Grade Crossing Elimination: Overcrossings: Hand, Mich., $182,600 (100); Lakeville, Ind., $87,000 (100); Lafayette, Ind., $61,000 (100); Gary, Ind., $200,000 (100); Shepherd, Ill., $113,000 (100); Edwardsville, Ill., $29,000 (100); St. Louis, Mo., $275,000 (100); St. Louis, Mo., $750,000 (40); Ottumwa, Iowa, $500,000 (100); Solomon, Iowa, $25,000 (100).

Subways: Hand, Mich., $269,500 (100); Toledo, Ohio, $340,000 (5); Peru, Ind., $155,000 (100); Ft. Wayne, Ind., $357,000 (50); Staunton, Ill., $140,000 (95); Tolono, Ill., $99,000 (100); Ferguson, Mo., $100,000 (100); Moulton, Iowa, $25,000 (80).

Reconstruction of bridges: Danville, Ill., $103,000 (100); Bingham, Iowa, $10,000 (100).

(Ann Arbor). Overcrossings: Mt. Pleasant, Mich., $124,600 (100); Temperance, Mich., $186,100 (100). Reconstruction of bridges: Musick, Mich., $85,250 (100).

Important Work Undertaken: New high-level bridge over Missouri river, including relocation of 7 miles of line, St. Charles, Mo., $3,250,000 (100).

Western Maryland

Grade Crossing Elimination: Overcrossing: Baltimore, Md., $32,000 (100). Subways: Thurmont, Md., $50,000 (100); Sabillasville, Md., $120,000 (100); Waynecastle, Pa., $215,000 (5); Elkins, W. Va., $59,000 (10). Relocation of main track, New Franklin, Pa., $120,000 (75).

Western Pacific

Grade Crossing Elimination: Overcrossings: Winnemucca, Nev., $75,000 (80); Deeth, Nev., $54,000 (100); Dunphy, Nev., $83,000 (100); Wendover, Utah, $56,000 (100); Garfield, Utah, $52,413 (10).

Subways: Niles, Cal., six subways and reconstruction of one subway bridge, W. P. allotment, $169,000 (10); Oakland, Cal., $87,000 (80); Stockton, Cal., $45,000 (90); San Leandro, Cal., $163,000 (100); Hayward, Cal., $90,000 (100). Removal of 0.9 mile of main track from East 12th street to private right of way, Oakland, Cal., $73,000 (100).

Important Work Undertaken: Reconstruction of bridges at various points, $142,000 (60).

Wheeling & Lake Erie

New Lines Under Construction: Bolivar, Ohio, to Sherrodsville, 14.61 miles. At Beach City, Ohio, 1.19 miles. Beach City, Ohio, to Barrs Mills, 8.14 miles. (All in connection with Muskingum Conservancy district reservoir work.)

Grade Crossing Elimination: Overcrossing: Canton, Ohio, $160,000 (0). Subway: Monroeville, Ohio, joint with state, $37,600 (100).

Important Work Undertaken: Cellular-type bulkhead, 1,313 ft. long, Slip 1, Huron, Ohio, $165,954 (82). New yard facilities, in connection with new car dumper, Huron, Ohio, $136,380 (95). High lift car dumper, including substation, kickbacks and approaches, $625,492 (60).

Railway Construction in Canada

Canadian National

First Track: Line revision, Lytton, B. C., 0.43 mile. Line revision, Kidd, B. C., 0.74 mile.

Grade Crossing Elimination: Subway: Morrisburg, Ont. (to be completed in 1937).

Important Work Undertaken: New passenger station and incidental facilities, London, Ont. (100).

Canadian Pacific

Grade Crossing Elimination: Subway: Port Arthur, Ont. (100).

Important Work Undertaken: Extending embankments and raising track in sags preparatory to ballasting program, $130,000 (100).

Railway Construction in Mexico

National of Mexico

New Lines Under Construction: Santa Catarina to Apalzingán, 80.8 miles (23). Sarabia to Campeche, 489.7 miles, projected to unite southeastern states (1). Ixcaquixtla to Chacahua, 279.6 miles (4.5). Barroterán, Coahula, to Muzquiz, 24.5 miles, $510,000 (100). Sebastapol Junction, Oaxaca, to Sebastapol, 12.7 miles, with a branch 2.8 miles long to Tuxtepec, $128,000 (100).

Important Work Undertaken: Acámbaro, Michoacan, to Uruapan, revision of alinement for 4 miles, $224,000 (100). Revision of alinement to provide better crossing of San Pedro river, Km 1516 to Km 1528, Meoqui, Chihauha, $177,000 (95). New bridge over San Pedro river, Chihauha, $170,000 (22). Construction of temporary station and trainshed to consolidate three stations, Buena Vista station, Mexico, D. F., $165,000 (100).

Handling Car Lumber on the D. & H. at Colonie

More Increases in Railway Material Costs in 1936

Taxes, wage adjustments and heavy buying add $125,000,000 to annual supply bill — Further advances this year

By D. A. Steel

Purchases and Stores Editor

THE inevitable effect upon commodity prices of widespread spending by federal and state governments, combined with the most powerful upthrust in private buying in seven years, is now clearly seen in the rising prices of materials and supplies purchased by railroads. This upward movement was retarded during the first six months of 1936 by sporadic labor disturbances, war scares and the uncertainty injected by the prospect of a stormy political campaign. Also, a Supreme Court decision last spring wrecked immediate plans for price pegging in coal selling.

Business activity, however, was persistent in all directions, and a flood of orders developed in the last half of the year, especially in the last quarter, which not only carried prices well above 1935 but also gave manufacturers and dealers the opportunity to make additional increases, effective January 1 of this year, to cover new taxes and wage increases to labor. Increases up to 10 per cent on iron and steel products, including an advance of $2.625 a ton in rails (from $36.375 a ton to $39) have already been made effective.

The average cost of coal for locomotives, freight included, was from 1 to 10 per cent lower on 25 railroads in 1936 than in 1935, and the cost without freight was lower on 75 railroads; but the average cost, with freight, to all railroads was 4 per cent over the previous year. Fuel oil and gasoline costs were increased 12 and 23 per cent, respectively. Lumber and tie costs showed average increases of 6 and 7 per cent over 1935, while materials of iron and steel averaged 2 per cent higher and prices obtained from the sale of scrap averaged 35 per cent higher. The weighted average cost of all materials purchased by the railroads appears to have been 3 per cent higher.

A 15 Per Cent Rise Since 1933

Compared with average costs in 1932 and 1933, whichever was lower, last year's averages showed a 19 per cent increase in delivered coal costs, a 43 per cent increase in fuel oil, a 90 per cent increase in lumber, a 25 per cent increase in ties and an 8 per cent increase in iron and steel costs, or a weighted average increase in all commodities of 15 per cent, while the average in-

crease in prices obtained from scrap was 70 per cent. The increase in prices since 1933 is estimated to have added approximately $125,000,000 to the expenditures of the railroads in 1936 for materials, supplies and fuel.

Considering only yearly averages, materials purchased by the railroads, the average cost of which was higher in 1936 than in 1935, included tie plates, track bolts and spikes, structural steel, cast iron and corrugated pipe, tool, boiler and spring steel, pig iron, brake shoes, grey iron castings, couplers, axles, pig lead, copper, journal bearings, rope, lubricating and illuminating oils, journal packing and creosote, besides lumber and scrap. Other materials averaged less; for example, track chisels and shovels, fencing, machine bolts, bar steel, nails, boiler lagging, air hose, rubber, glass, cement, soda ash, oxygen, bridge stringers and fir ties. Materials, whose yearly average cost was unchanged from 1935, included rail, boiler tubes, sheet iron, locomotive brake shoes, malleable and steel castings, car wheels, tires, fire brick, leather, grease, paint ingredients, lime and oak ties. Special appliances to machinery were also in this category, and it is noteworthy that the prices of these materials moved neither one way nor the other during the year.

Prices Close Strong

It is also noteworthy of buying in 1936 that material costs which changed were, with scarcely no exception, substantially higher at the close of the year than at the beginning, or even during the summer months. Nails and car oil declined, but tie plate prices advanced $2 a ton; track bolts and spikes and cast iron pipe, $3 a ton; structural steel, $6; bar steel, $4; tool steel, $10; boiler steel, $2; spring steel, $4; brake shoes, $1; couplers and axles, $2; lead, $3; copper, $4; journal bearings, $8; rope, $5; rubber, $8; linseed oil, $4; gasoline, signal oil and creosote oil, from 5 cents to 8 cents a barrel; lumber, from $1 to $5 per MBM; ties, $0.10 each; and scrap iron, from $2 to $3.50 a ton.

With these advances in 1936 and the additional increases which are already in effect or in prospect for 1937, average prices are now about in line with those prevailing in 1929, and are likely to stick. This time, with business at a peak for some industries, it is the seller who appears to be in the saddle. Significant are reports from railroads that, while specifications are being observed satisfactorily, competitive bidding is not as keen as it was in certain lines of buying, and that orders are not being filled as promptly as before.

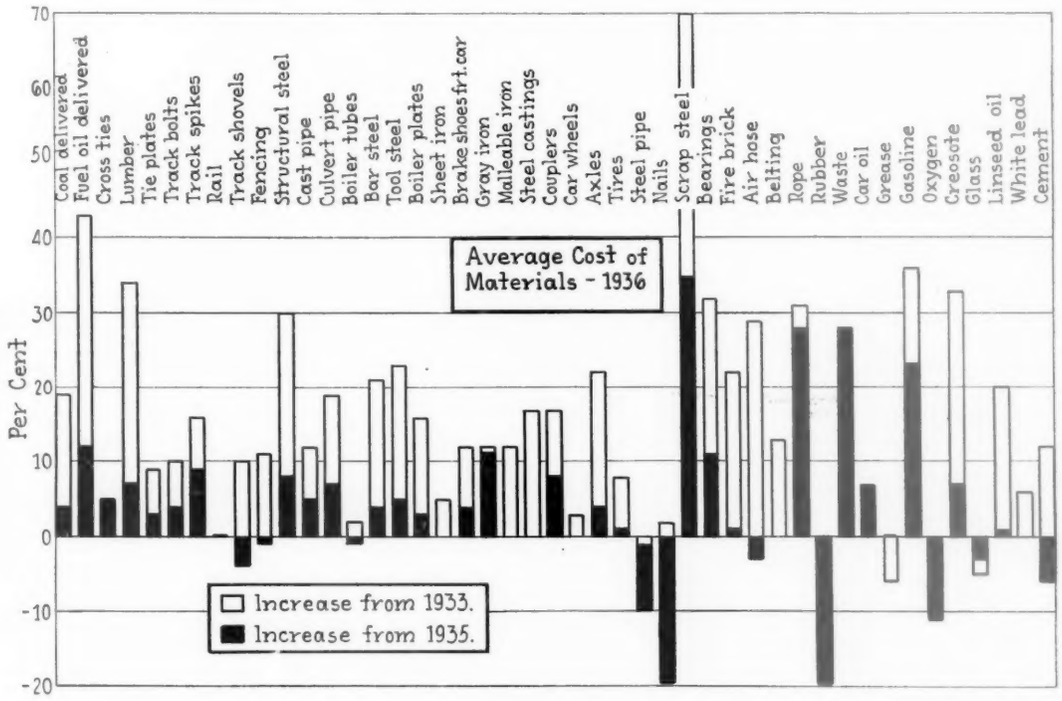
Laws and Labor Color Coal

Since coal produces 20 per cent of all railroad revenues from freight and takes 30 per cent of their expenditures for materials and supplies, it has a special interest to large and small railroads alike. The invalidation of the Guffey coal bill, the boom in consumption, the expiration of wage agreements and competition from substitute fuels are the highlights.

Trend of Year-Average Cost of Railway Materials, 1914-1936

The beginning of 1936 found the National Bituminous Coal Commission, created by the so-called Guffey Act, or, more properly, the Bituminous Coal Conservation Act of 1935, demanding data on the cost of production on which minimum prices could be established

Year-Average Cost of Railway Materials Compared to 1933 and 1935



Average Unit Costs of Railroad Materials—1927-1936*

Description		Unit	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936 First Quarter	1936 Mid-year	1936 Last Quarter	1936 High	1936 Low	1936 Average	Per Cent of 1935	Per Cent of 1933
Track Materials																			
Rail		N. t.	$43.00	$43.00	$43.00	$43.00	$43.00	$42.00	$38.79	$36.37	$36.37	$36.375	$36.375	$36.375	$36.375	$36.375	$36.375	100	100
Tie plates	Steel	N. t.	45.98	42.43	42.10	41.22	38.88	36.40	36.64	39.56	38.73	39.44	39.44	40.84	43.58	38.77	39.91	103	109
Track bolts	Heat-treated, with nuts	Cwt.	4.00	3.83	3.75	3.94	3.74	3.42	3.52	3.71	3.71	3.84	3.84	3.94	4.15	3.60	3.87	104	110
Track chisels	Alloy steel	Ea.	1.96	1.76	1.74	1.71	1.64	1.64	1.70	1.71	1.79	1.69	1.69	1.69	1.72	1.64	1.69	95	100
Track spikes	High-carbon steel	Cwt.	2.80	2.76	2.71	2.68	2.57	2.45	2.32	2.46	2.46	2.62	2.66	2.75	2.85	2.43	2.68	109	116
Track shovels	No. 2 carbon steel	Doz.	12.95	13.82	11.28	10.02	9.98	10.93	11.53	13.20	13.26	12.67	12.70	12.72	15.95	11.00	12.70	96	110
Bond wire	35 in. to 48 in. cop. clad	Cwt.	14.78	17.50	18.56	17.69	15.89	14.48	14.99	16.27	16.33	14.91	15.16	15.11	17.05	7.76	15.06	93	101
Wire fence	26 in. to 47 in. woven	Rod	.467	.488	.426	.428	.396	.383	.370	.402	.416	.402	.398	.408	.524	.258	.403	99	111
Steel, structural	Angles	Cwt. b.	1.98	1.98	2.35	1.98	1.84	1.73	1.75	1.93	1.96	2.13	2.21	2.24	3.65	1.80	2.19	111	125
Steel, structural	Fabricated	Cwt. b.	4.17	4.17	3.32	3.35	2.73	2.72	2.90	3.28	3.46	3.72	3.80	3.73	4.50	3.80	3.75	108	130
Pipe, cast-iron	12 in. Class B	N. t.	41.13	41.13	39.41	40.37	35.58	33.94	37.91	40.80	40.60	42.03	42.03	42.70	50.00	38.00	42.25	105	112
Pipe, clay	Culvert, 24-in. corr.	Ft.	....	....	....	....	....	1.95	1.74	2.02	2.16	2.19	2.19	2.19	3.23	1.31	2.19	101	126
Locomotive and Car Materials																			
Bolts, with nuts	¾ by 6, machine	100 pcs.	5.13	5.02	4.87	4.81	4.20	4.04	4.70	4.59	4.08	3.95	4.02	3.94	5.04	3.20	3.97	97	85
Boiler tubes	2-in. No. 11 gage steel	ft.	.172	.172	.174	.154	.152	.152	.156	.161	.161	.158	.158	.158	.163	.152	.158	99	102
Bar steel	Open-hearth	Cwt. b.	2.13	2.58	2.17	1.85	1.80	1.72	1.73	1.84	2.01	2.01	2.08	2.18	2.62	1.85	2.09	104	121
Steel	High-speed tool	Lb. b.	.59	.58	.57	.66	.52	.49	.52	.60	.61	.63	.64	.65	.95	.55	.64	105	123
Steel	Boiler	Cwt. b	2.01	2.00	2.33	2.01	1.86	1.73	1.82	2.10	2.05	2.07	2.14	2.16	2.62	1.95	2.12	103	116
Steel	Spring	Cwt. b.	2.74	2.63	2.84	2.62	2.42	2.18	2.23	2.31	2.36	2.48	2.53	2.62	3.50	1.90	2.54	109	115
Steel	24-gage black	Cwt.	3.20	2.99	3.25	2.90	2.65	2.69	2.68	2.72	2.81	2.77	2.81	2.87	3.65	2.40	2.82	100	105
Pig iron	No. 1	G. t.	20.50	20.50	17.35	16.61	15.37	14.85	15.74	18.30	18.59	19.64	19.39	19.39	20.57	17.50	19.47	104	123
Brake shoes	Locomotive driving	N. t.	61.70	61.70	59.54	60.00	56.53	54.28	54.50	56.30	56.65	56.00	56.00	57.00	57.00	54.00	56.65	100	103
Brake shoes	Freight car	N. t.	36.93	39.98	37.55	35.42	35.12	32.70	33.40	35.00	36.00	37.50	37.60	38.20	48.00	35.00	37.77	104	112
Castings, grey iron	Green sand	Cwt.	3.86	3.97	4.12	4.12	4.09	3.82	3.82	3.90	3.87	4.18	4.11	4.11	5.00	4.10	4.14	107	108
Castings, malleable	7 to 15 lb., 25 to 100	Cwt.	9.13	8.50	8.68	8.27	7.68	7.59	7.42	8.99	8.29	8.42	8.42	8.42	9.15	5.25	8.42	102	108
Castings, steel	25 to 50 lb., under 50	Cwt.	8.64	7.97	8.32	8.46	7.73	7.37	7.25	8.52	8.49	8.52	8.52	8.52	9.50	7.00	8.52	100	117
Couplers, car	5 by 7 by 6½ ARA—	Pr.	41.20	40.20	40.20	41.20	39.20	38.13	37.20	40.20	40.20	41.43	42.93	42.93	50.95	31.55	42.43	105	111
Wheels, car	33-in. chilled iron	Cwt.	....	....	....	....	....	....	1.35	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	100	103
Axles, locomotive	Driving, carbon	Cwt.	5.16	5.21	4.84	4.29	4.75	4.55	4.56	4.90	5.06	5.21	5.27	5.29	6.09	4.68	5.26	104	115
Axles, car	5 by 9, rough turned	Cwt.	2.94	2.94	2.94	2.88	2.88	2.75	2.53	2.89	2.98	3.05	3.09	3.13	3.58	2.80	3.09	104	122
Tires, frt. loco.	33-in., rough bored	Cwt.	6.11	6.11	5.84	6.22	6.03	5.86	5.55	5.67	5.97	5.81	5.83	5.83	6.36	5.35	5.83	101	108
Pipe	1-in. black steel	Ft.	.076	.069	.066	.067	.069	.063	.063	.066	.069	.063	.061	.061	.077	.055	.062	90	99
Wire nails	Common	Cwt. b.	2.58	2.62	2.62	2.29	2.07	2.18	2.23	2.62	2.83	2.36	2.24	2.26	2.65	1.95	2.28	80	102
Pig lead	Virgin	Cwt.	7.04	6.43	6.95	5.64	4.42	3.53	4.17	4.04	4.44	4.79	4.90	4.93	6.75	4.40	4.87	110	117
Copper	Sheet, soft	Lb.	.218	.23	.27	.259	.181	.180	.169	.180	.211	.208	.214	.214	.255	.165	.212	102	127
Journal bearings	A.R.A.	Lb.	.142	.141	.167	.149	.10	.07	.081	.093	.096	.104	.106	.108	.113	.103	.106	111	132
Wire, copper	No. 9 bare	Lb.	.149	.167	.195	.163	.115	.100	.113	.138	.141	.140	.142	.143	.152	.128	.142	101	126
Wire, copper	T.B. Weather, No. 10	Cwt.	18.70	19.73	21.00	19.00	15.81	13.00	18.30	18.80	18.76	20.43	20.90	20.96	25.90	18.55	20.76	111	115
Miscellaneous																			
Boiler lagging	1¼ in. by 6 by 36 mag.	Sq.ft.	.21	.22	.236	.160	.155	.156	.156	.157	.160	.154	.154	.154	.159	.152	.154	97	99
Fire brick	Soft	M	41.74	43.08	41.73	41.85	39.29	34.70	37.20	44.58	45.26	45.64	45.64	45.64	47.75	42.50	45.64	101	122
Hose	Air-brake, 1⅜ by 22	Ft.	.48	.46	.44	.45	.37	.33	.31	.39	.41	.41	.40	.40	.42	.36	.40	97	129
Leather	Belting, 6-in. double	Ft.	1.22	1.35	1.39	1.39	1.23	1.27	1.17	1.32	1.31	1.32	1.32	1.31	1.72	.73	1.32	100	113
Rope	¾-in. manila	Lb.	.217	.199	.199	.189	.153	.142	.127	.142	.130	.164	.173	.165	.205	.125	.167	128	131
Cable	¾-in. 6 by 19 steel	Ft.	.125	.119	.144	.14	.143	.132	.137	.155	.161	.161	.161	.161	.214	.143	.161	100	117
Rubber, red	⅛-in. sheet packing	Lb.	.32	.28	.247	.25	.225	.176	.172	.177	.167	.129	.130	.133	.170	.102	.131	79	76
Gasoline	Gal.	....	....	....	....	....	....	.049	.047	.049	.051	.061	.064	.063	.092	.045	.063	123	136
Oil	Long time—tanks	Gal	.096	.09	.087	.117	.062	.061	.051	.053	.052	.054	.056	.055	.085	.032	.055	106	107
Oil	Car—tank lots	Gal.	.180	.157	.157	.163	.138	.127	.134	.135	.132	.143	.140	.141	.180	.120	.141	107	105
Grease	Driving box	Lb.	.160	.122	.125	.131	.122	.118	.109	.104	.103	.102	.102	.102	.110	.093	.102	100	94
Waste	Colored cotton	Lb.	.098	.091	.086	.084	.076	.051	.057	.065	.057	.073	.073	.072	.080	.057	.073	128	128
Creosote oil	Tank lots	Gal.	.157	.157	.139	.130	.115	.108	.093	.106	.116	.123	.123	.125	.130	.109	.124	107	133
Glass	24 by 24 dsa	Box	5.23	5.10	5.76	5.84	4.80	4.71	5.18	4.59	5.03	4.65	4.84	4.94	5.73	3.57	4.81	96	95
Linseed oil	Boiled	Lb.	.088	.093	.117	.120	.09	.068	.087	.095	.103	.104	.103	.106	.118	.096	.104	101	120
White lead	In oil—100-lb. keg	Lb.	.11	.102	.104	.106	.107	.088	.08	.081	.085	.083	.087	.087	.088	.079	.085	100	106
Cement, Portland	In paper	Bbl.	2.21	1.85	1.87	1.76	1.42	1.42	1.80	1.95	2.16	2.02	2.02	2.02	2.12	1.85	2.02	94	112
Soda ash	Water softening	Cwt.	1.33	1.40	1.46	1.56	1.55	1.30	1.21	1.31	1.32	1.30	1.30	1.30	2.50	.80	1.30	99	107
Hydrated lime	Water softening	N. t.	13.63	11.99	11.96	9.73	9.53	9.49	8.35	8.50	8.48	8.55	8.63	8.59	11.32	6.25	8.59	101	102
Oxygen		100 cu.ft.	1.29	1.04	1.03	1.05	1.06	1.02	1.04	1.10	1.06	.94	.94	.94	1.10	.60	.94	89	90
Forest Products—Mill																			
Lumber	Fir, 1 by 6 by 9 B&B siding	M ft.	....	....	....	....	....	18.76	25.14	31.40	32.10	32.20	33.00	32.50	47.00	28.00	32.50	100	128
Lumber	Fir, 2 by 6 by 18 B&B sheathing	M ft.	....	....	....	....	....	21.83	36.75	45.00	37.29	46.16	48.16	47.33	50.00	40.00	47.22	126	128
Lumber	Fir sill, 6 by 6 sel. com. rgh.	M ft.	....	....	....	....	....	10.23	13.00	19.00	17.98	19.60	20.70	20.30	23.00	16.50	20.20	112	156
Bridge stringers	Fir, 16 in. by 32 ft. or less	M ft.	....	....	....	....	....	12.52	15.70	23.50	21.15	20.31	21.12	20.62	33.00	18.00	20.69	96	132
Cross ties	Fir, 7 by 9 by 8'6	Ea.	.60	.60	.67	.80	.50	.50	.49	.53	.49	.39	.39	.39	.50	.28	.39	80	80
Cross ties	Pine, 7 by 9 by 8'6	Ea.	.67	.67	.67	.77	.65	.73	.64	.62	.57	.71	.71	.73	1.00	.60	.72	126	110
Cross ties	White oak, 7 by 9 by 8'6	Ea.	.98	.95	.93	.92	.83	.75	.69	.69	.67	.82	.82	.82	1.22	.57	.82	103	119
Scrap Iron Sold																			
Railroad scrap	No. 1 railroad wrought	N. t.	11.16	11.39	11.96	8.68	7.20	4.20	6.65	7.96	9.07	11.56	11.77	13.28	14.25	9.65	12.20	137	180
Railroad scrap	No. 1 heavy melt	N. t.	11.63	11.34	12.82	10.62	7.33	5.34	7.32	8.55	9.29	11.77	11.68	13.51	15.40	9.80	12.32	133	169
Railroad scrap	Rails for re-rolling	N. t.	13.80	12.92	14.49	12.55	10.05	7.18	8.10	9.22	9.89	12.21	12.79	14.62	17.60	10.00	13.21	134	163

* Compiled by *Railway Age* from special reports of railroads.

in the bituminous coal industry. Opinion was divided both as to its validity and as to the wisdom of the early establishment of prices by the coal commission and a number of large producing companies had filed injunctions and were expected to offer low-price competition to producers who had no injunctions and who were pledged to comply with the act.

The price war which had started with the invalidation of the NRA by the Supreme Court on May 27, 1935, was gaining momentum and the low-cost-of-production prices on some sizes of bituminous coal were being quoted and accepted; and, while some operators were urging the immediate establishment of the minimum prices of the coal commission because of this situation, others were objecting and forecasting non-compliance of the larger shippers holding injunctions. In the latter part of January, 1936, and the first part of February, there also occurred a cold wave of unusual duration which increased the demand for coal materially and slowed down production and shipments to such an extent that for several weeks mines were permitted to work six days instead of the five days prescribed in the agreement with mine labor.

No prices were established by the coal commission and on May 18 the long-awaited decision of the Supreme Court was made and the labor clause of the Bituminous Coal Conservation Act of 1935 was invalidated and the price-fixing portion fell with it, although the existence of the coal commission was held to be legal and it continued to function with curtailed powers. With the invalidation of this act, the United Mine Workers, who had originated the bill, feared that the price war would result in efforts to break the existing wage-scale contract, but nothing was attempted in general and the price war continued. Some buyers continued to pay the old NRA code prices, while others requested bids and reported quotations considerably below those prices. During the last days of the 74th Congress, a new regulatory bituminous coal bill was submitted and passed the house, but it failed to come to a vote in the senate because of a filibuster during the closing hours of the session on June 20.

Car Shortages Stiffen Prices

As general business improved, bituminous coal production increased, but the report of low prices continued. Toward fall, as the heating season approached and

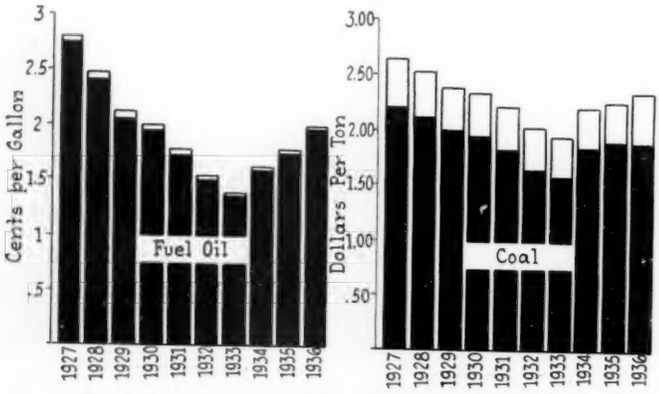
Average Cost of Coal Per Ton—9 Months, 1936

Region and Road	With Freight 1936	With Freight 1935	Without Freight 1936	Without Freight 1935
New England Region:				
Bangor & Aroostook	$5.11	$4.97	$1.59	$1.46
Boston & Albany	4.52	4.49	1.74	1.66
Boston & Maine	4.46	4.37	2.36	2.21
Canadian National (In New Eng.)	4.92	5.25	1.30	1.65
Canadian Pacific (In Maine)	5.04	4.99	2.39	2.41
Canadian Pacific (In Vermont)	5.06	5.08	1.72	1.85
Central Vermont	4.88	4.94*	1.94	1.96*
Maine Central	4.76	4.64	4.70	4.57*
New York, New Haven & Hartford	4.03	3.84*	1.61	1.53*
Rutland	4.15	4.04	1.54	1.40*
Great Lakes Region:				
Ann Arbor	3.56	3.48	1.67	1.64
Cambria & Indiana	1.93	1.90	1.93	1.90
Delaware & Hudson	3.79	3.84	2.07	2.09
Delaware, Lackawanna & Western	3.42	3.18	1.83	1.69
Detroit & Mackinac	4.25	4.23*	1.66	1.88*
Detroit & Toledo Shore Line	3.82	3.42	1.75	1.81
Erie (Inc. Chicago & Erie)	2.37	2.36	1.84	1.82*
Grand Trunk Western	3.36	3.15	1.53	1.38
Lehigh & Hudson River	4.30	4.31	2.20	2.34
Lehigh & New England	3.46	3.41	1.77	1.82
Lehigh Valley	3.59	3.42*	1.66	1.60*
Monongahela	1.79	1.75	1.65	1.63
Montour	1.91	1.87	1.91	1.87
New Jersey & New York	4.95	4.89	1.86	1.85*
New York Central	2.12	2.01*	1.84	1.81*
New York, Chicago & St. Louis	3.23	3.19	1.76	1.76
New York, Ontario & Western	3.51	3.41	1.83	1.76
New York, Susquehanna & Western	4.70	4.64	1.86	1.85*
Pere Marquette	3.77	3.62	1.79	1.77
Pittsburgh & Lake Erie	1.98	2.00	1.88	1.84
Pittsburg & Shawmut	1.88	1.99	1.84	1.90
Pittsburgh & West Virginia	1.76	1.82	1.68	1.68
Pittsburg, Shawmut & Northern	1.91	1.93	1.91	1.93
Wabash	2.13	1.93*	1.74	1.67
Central Eastern Region:				
Akron, Canton & Youngstown	3.00	3.15	1.69	1.82
Baltimore & Ohio	1.85	1.86	1.77	1.77
Bessemer & Lake Erie	2.10	2.17	1.86	1.85
Central of New Jersey	3.50	3.37	1.74	1.52
Chicago & Eastern Illinois	1.93	1.89	1.85	1.81
Chicago & Illinois Midland	1.84	2.05	1.69	1.93
Chicago, Indianapolis & Louisville	1.90	1.92	1.81	1.83
Detroit, Toledo & Ironton	2.71	2.77	1.73	1.72
Elgin, Joliet & Eastern	1.92	1.82	1.69	1.67
Illinois Terminal	1.95	1.81*	1.85	1.74*
Long Island	4.42	4.37	1.91	1.92
Missouri-Illinois	1.82	1.78	1.75	1.64
Pennsylvania system	1.96	1.96	1.83	1.84
Penna.-Read. Seashore Lines	4.55	4.33	2.90	2.83
Reading	3.28	3.07	1.93	1.82
Staten Island Rapid Transit	4.57	4.44	2.47	2.18
Western Maryland	1.96	1.93	1.86	1.89
Wheeling & Lake Erie	1.98	1.99	1.90	1.90
Pocahontas Region:				
Chesapeake & Ohio	1.92	1.90	1.86	1.83
Norfolk & Western	1.79	1.69*	1.73	1.70
Richmond, Fredericksburg & Potomac	3.82	3.67*	1.48	1.50*
Virginian	1.80	1.81	1.80	1.81
Southern Region:				
Alabama Great Southern	2.11	2.03	2.02	1.94
Atlanta & West Point (Inc. Western of Alabama)	3.25	3.23	1.88	1.88
Atlanta, Birmingham & Coast	2.31	2.15	2.03	1.95
Atlantic Coast Line	3.38	3.26	1.68	1.66
Central of Georgia	2.41	2.44	2.29	2.33
Charleston & Western Carolina	3.31	3.27	1.74	1.72
Southern Region—*Continued*				
Cin. New Orleans & Tex. Pac.	$2.22	$2.15	$1.76	$1.77
Clinchfield	1.74	1.74	1.64	1.68*
Columbus & Greenville	2.58	2.82	1.14	1.56
Georgia	3.65	3.63	1.61	1.67
Georgia & Florida	3.55	3.55	1.74	1.73
Georgia, Southern & Florida	4.47	4.27	2.25	2.17
Gulf & Ship Island	3.66	3.45*	1.48	1.53*
Gulf, Mobile & Northern	2.16	2.14	1.26	1.31
Illinois Central Lines	2.06	1.91*	1.75	1.72*
Louisville & Nashville	1.88	1.74*	1.72	1.74*
Mississippi Central	3.27	3.35	1.22	1.35
Mobile & Ohio	2.10	1.92*	2.04	1.92*
Nashville, Chat. & St. Louis	2.28	2.19	1.91	2.07
New Orleans & Northeastern	3.88	3.65	1.95	1.79
Norfolk Southern	3.48	3.32*	1.59	1.57*
Northern Alabama	1.90	1.89	1.88	1.88
Seaboard Air Line	2.93	2.85	1.73	1.71
Southern	1.82	1.81	1.68	1.68
Tennessee Central	1.94	1.76*	1.73	1.72
Northwestern Region:				
Chicago & North Western	1.90	1.68	1.80	1.58
Chicago Great Western	2.71	2.60*	1.47	1.43
Chicago, Milw., St. P. & P.	2.24	2.17	2.09	2.06*
Chicago, St. P., Minn. & Omaha	4.32	4.10	3.22	3.09
Duluth, Missabe & Northern	4.28	3.88*	3.57	3.75*
Duluth, South Shore & Altantic	4.48	4.57	3.76	3.76
Duluth, Winnipeg & Pacific	4.29	4.54	4.06	4.34
Great Northern	3.51	3.43	3.15	3.11
Green Bay & Western	4.28	4.48	4.27	4.48*
Lake Superior & Ishpeming	4.69	4.70	4.66	4.59
Minneapolis & St. Louis	2.17	1.99*	1.86	1.98*
Minn., St. P. & Sault Ste. Marie	3.65	3.66	2.92	2.93
Northern Pacific	2.05	2.22	1.97	2.11
Spokane International	4.20	4.50	2.92	2.91
Central Western Region:				
Alton	2.04	1.92	1.88	1.76
Atchison, Topeka & Santa Fe	2.80	2.58*	2.62	2.57*
Chicago, Burlington & Quincy	1.66	1.71	1.55	1.64
Chicago, Rock Island & Pacific (Inc. Chic. R. I. & Gulf)	2.34	2.25	2.07	2.00
Colorado & Southern	2.74	2.56	2.51	2.36
Denver & Rio Grande Western	2.05	1.90	1.95	1.82
Denver & Salt Lake	1.42	1.33	1.45	1.35
Ft. Worth & Denver City	4.90	4.64	2.55	2.40
Nevada Northern	4.83	4.58*	1.76	1.75*
Northwestern Pacific	2.21	2.72	2.21	2.72
Southern Pacific (Pacific Lines)	3.32	3.15	3.05	2.85
Toledo, Peoria & Western	1.63	1.55	1.58	1.54
Union Pacific	2.16	2.40*	2.06	2.40*
Utah	1.55	1.37	1.45	1.25
Western Pacific	3.32	3.20*	2.04	2.00*
Southwestern Region:				
Ft. Smith & Western	2.69	2.70	2.52	2.52
Ft. Worth & Rio Grande	...	...	2.92	...
International-Great Northern	1.09	...	1.09	...
Kansas City Southern	2.30	2.04*	1.90	2.04*
Kansas, Oklahoma & Gulf	2.18	1.91*	2.10	1.55*
Louisiana & Arkansas	1.66	...	1.66	...
Midland Valley	1.78	1.51*	1.69	1.51*
Missouri & Arkansas	2.75	2.57	2.15	2.00
Missouri-Kansas-Texas lines	2.73	2.90	2.35	2.45
Missouri Pacific	1.89	1.79	1.84	1.71
Oklahoma City-Ada-Atoka	2.69	2.31*	2.53	1.91*
St. Louis-San Francisco	2.10	2.02*	1.95	1.97*
St. Louis-San Francisco & Texas	1.81	...	1.81	...
St. Louis Southwestern	2.22	2.31	1.39	1.53
Texas & New Orleans	4.59	...	4.59	...

* Report in 1935 not exactly comparable with 1936, owing to change in I. C. C. forms.

* Compiled by Railway Age from special reports of railroads.

lake shipments gained in volume, car shortages in some districts were reported and the industry hoped that this would stimulate demand and increase price, both of which were realized to a limited extent. As the presidential election approached, speculation increased as to the possibility of a new congressional act as a regulatory measure for the bituminous coal industry; and now with the election over, the submission to congress of such a



Average Costs of Coal and Fuel Oil for Locomotives with and without Freight

bill has been promised by former sponsors and the coal industry feels that some form of regulatory legislation of bituminous coal is inevitable.

The total bituminous production for the first 10 months of 1936 amounted to about 360,000,000 tons, or nearly 15 per cent more than in the same period of the previous year, and it appears that this increased production was maintained until the close of the year, in harmony with increased industrial activity. January and February of this year are expected to make further increases in the consumption of bituminous coal, and it is estimated in some quarters that 12,000,000 tons will be produced weekly during the next few months.

On April 1, 1937, the wage agreement between the bituminous coal operators and the United Mine Workers expires, but it is early to predict the outcome, although buyers will probably stock some coal as a precautionary measure; and it is felt that this together with the increased demand during January and February will act as a stimulant of production and prices. Many railroads, after the experience last year, when they were compelled to confiscate commercial shipments of coal for their own use, have already provided themselves with storage coal.

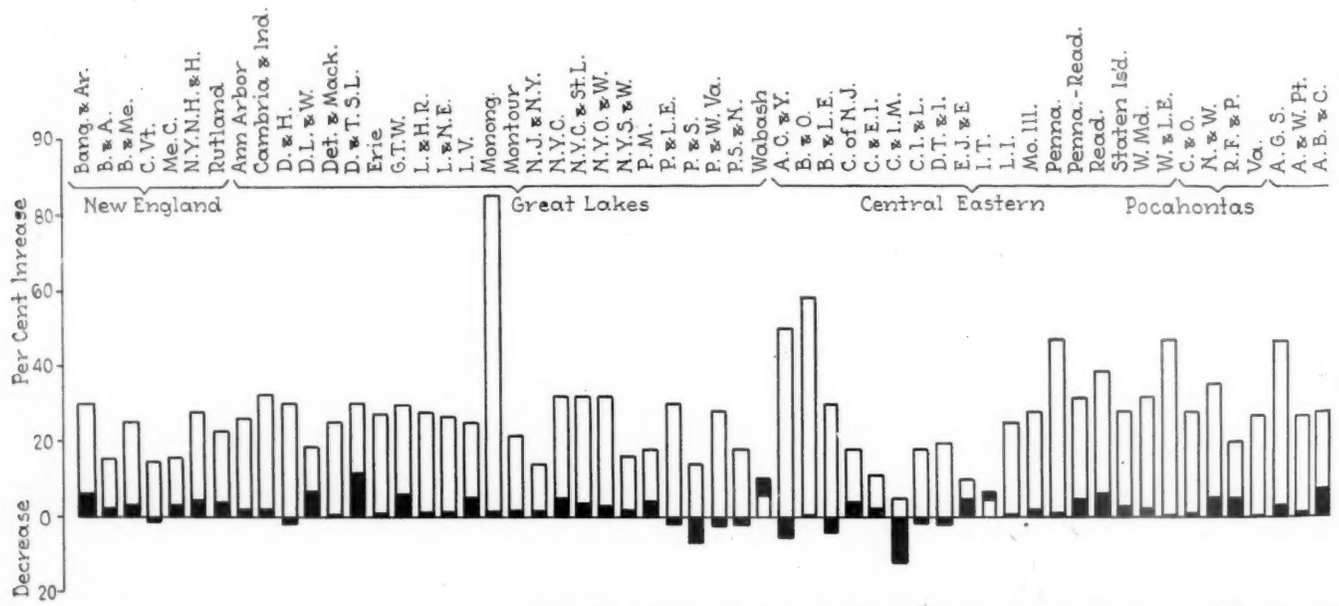
During the last two years, the cost of coal to many railroads, as well as to commercial users, has been increased by the surcharge of 10 per cent on freight. The applications of railroads to extend the surcharges were denied on December 19 and the surcharges expired therefore on January 1.

In approaching a new wage agreement and negotiating coal prices, on the other hand, labor, as well as producers, is confronted with the more serious problem created by the increasing competition from substitute fuels and is bound in its own interest to reduce rather than to increase the cost of energy to the consumer. With the government actively promoting hydro-electric plants for generating electric power on the one hand and the increase in the use of Diesel power by railroads, the issue is already pronounced and should be a positive deterrent to increased coal prices this year.

Higher Fuel Oil

Significant of the railroads' interest in fuel oil is the fact that this commodity is used almost entirely for locomotive fuel on some roads; also the consumption of refined derivatives for Diesel power have increased on coal roads. Fuel oil consumption by railroads in 1936, amounting to approximately 2,000,000,000 bbl., was 15 per cent larger than in 1935, as compared with an 8 per cent increase in coal consumption; and 28.4 bbl. of fuel oil are now being used by railroads for every ton of coal, as compared with 22.8 bbl. in 1929.

Control over oil is obtained through compacts between states, allowing restraints on the amount of crude oil which can be produced, and also by maintaining a sizable duty on foreign oil. The increasing market for fuel oil for homes and the larger profit obtainable from refined by-products of crude oil, moreover, tend to restrict the supply of grades purchased for steam locomotives sufficiently to induce some roads to carry considerable oil in storage. These factors have been present in the higher average prices paid last year by railroads.



Cost of Locomotive Coal on Various Railroads—1936 Compared to 1933 and 1935

The fuel oil market continues to be highly competitive, however. Bootleg oil still flows and crude oil and fuel oil enter the domestic market from other lands, notably Argentina, so that no serious difficulties were met by railroads in obtaining their oil supply, and some roads obtained oil last year for less than in 1935. Prices of contract oil ranged from 50 cents to 90 cents a barrel and spot oil from 50 cents to 72½ cents a barrel in different fields and did not fluctuate to any extent during the 12 months. If prices advance this year, it will be due principally to increases in the already heavy tax load which this commodity carries.

The wide variation in prices paid by different roads for gasoline is the main point of interest about this commodity. Last year, the spread was from 4.5 cents to 9.2 cents a gallon, depending upon the location as well as upon the grade used. Fluctuations during the last year were less than a cent a gallon and the prevailing prices are definitely above those of 1935.

Cost Per Ton of Coal for Locomotives—Class I Railroads*

	1924 Dollars	1925 Dollars	1926 Dollars	1927 Dollars	1928 Dollars	1929 Dollars	1930 Dollars	1931 Dollars	1932 Dollars	1933 Dollars	1934 Dollars	1935 Dollars	1936† Dollars
Eastern District....	3.11	2.75	2.67	2.70	2.55	2.45	2.39	2.22	2.04	1.95	2.33	2.40	2.51
Pocahontas Region.	2.13	1.78	1.82	1.78	1.69	1.67	1.68	1.66	1.58	1.52	1.77	1.85	1.94
Southern Region....	2.78	2.40	2.31	2.26	2.19	2.10	2.06	1.95	1.79	1.74	2.00	2.12	2.24
Western District...	3.22	3.02	2.94	3.00	2.82	2.61	2.53	2.45	2.31	2.17	2.19	2.21	2.29
United States.....	3.03	2.72	2.63	2.66	2.53	2.40	2.34	2.21	2.05	1.96	2.20	2.27	2.37

* Invoice plus freight charges—I. C. C.
† 9 months.

Cost Per Gallon of Fuel Oil for Locomotives—Class I Railroads*

	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936† Cents
Eastern District....	5.83	5.98	5.81	5.86	3.84	3.55	4.13	3.87	2.97	3.19	4.66	3.99	3.62
Southern Region...	3.57	3.96	3.97	3.97	2.98	2.37	2.21	1.85	1.32	1.64	2.41	2.43	2.33
Western District...	2.75	3.09	2.91	2.78	2.47	2.12	1.99	1.76	1.54	1.40	1.60	1.79	2.02
United States.....	2.78	3.13	2.95	2.81	2.48	2.12	2.00	1.77	1.55	1.41	1.62	1.80	2.02

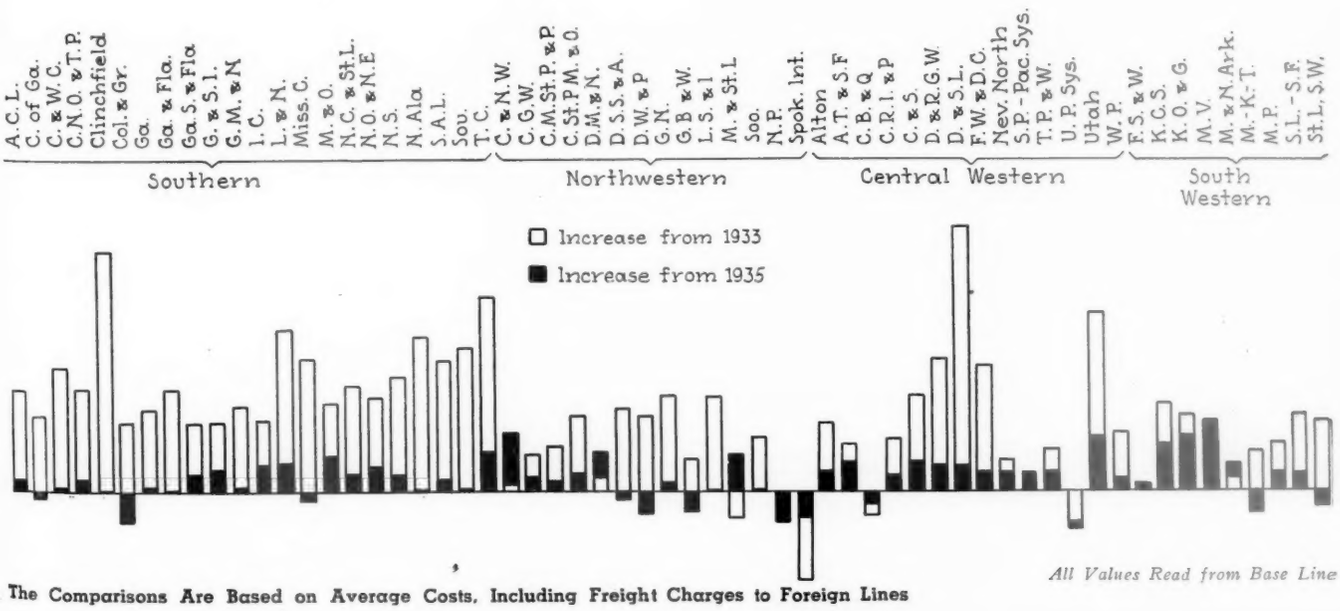
* Invoice plus freight charges—I. C. C.
† 9 months.

Recent Advances in Steel Prices

Most dramatic of the developments affecting prevailing railway material costs during 1936 were those in the steel industry. So far as that source of railway material is concerned, the depression has been over for some time. Pig iron output and ingot production last year were 45 per cent and 41 per cent, respectively, above 1935 and were exceeded only in the years 1926, 1928 and 1929. There are now 12 per cent more men employed in steel manufacture than in 1929, and some mills are taxed beyond their capacity for weeks ahead, so great has been the revival in purchasing of steel products for building, for automobile manufacture, for export and also for the railroads which have dominated the market for several months.

The small yearly average increase in iron and steel prices to railroads was much less than might have been expected in view of the remarkable recovery in steel manufacture. The explanation lies partly in the fact that in no year have railroad prices changed as much as the general average of iron and steel prices for all trade. During the first six months, also, partly because of labor troubles facing the steel manufacturers and also because of competition among producers at a time when national political questions were disturbing, average steel prices receded about 6 per cent.

Among the first increases in costs to the railroads last year were those resulting from the adjustments made by casting makers to cover the cost of an occupational tax levied for the protection of workmen breathing abrasives. The "big moment" came in November with the volun-



All Values Read from Base Line

The Comparisons Are Based on Average Costs, Including Freight Charges to Foreign Lines

tary 10 per cent increase in wage scales, which will add $75,000,000 to the industry's labor costs and raise basic wages 19 per cent above those prevailing in 1929. With average prices in 1936 still 5 per cent below 1929, the steel industry thus took advantage of the extremely heavy buying since October to readjust its quotations and railway costs have yet to feel the full effect of increases made in 1936, or which become effective this year. It is doubtful, however, if the cost of iron and steel purchased by the railroads this year will reach the 1929 average. With steel rails $3 a ton higher than in 1936, they will still be $3 a ton under 1929.

Scrap Profits Soar

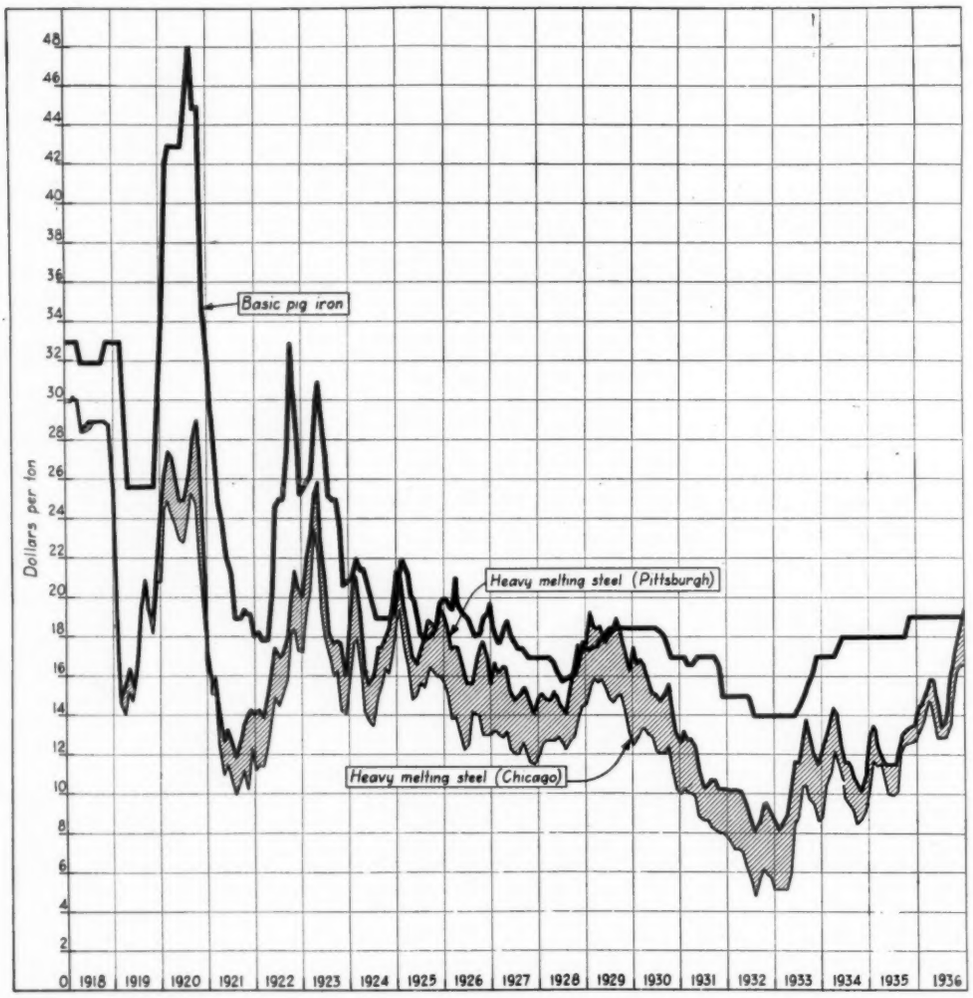
While the year-average price of iron and steel purchased for railroads increased moderately in 1936, the prices which the railroads obtained from their scrap iron and steel increased spectacularly. Prices for all classes of railroad scrap ran much ahead of 1935; they showed an average increase of about 37 per cent over the previous year and an increase of more than double the prices offered in 1932. The tonnage of railroad scrap sold in 1936 was in the neighborhood of 4,000,000 tons. The increase in prices would thus appear to have increased their gross revenues from scrap sales more than $10,000,000, a profit which has made some of the increases in the costs of material purchased less burdensome than would otherwise be the case.

Scrap prices have been increasing almost steadily since 1933 and are now not only higher than in 1929, but in some areas are the highest on record. This condition clearly reflects the shortage of scrap for steel manufacture and presages the maintenance of prices at high levels throughout this year. It continues to prove an additional incentive to railroads to proceed with the dismantling of old equipment.

Strike Trouble in Lumber Camps

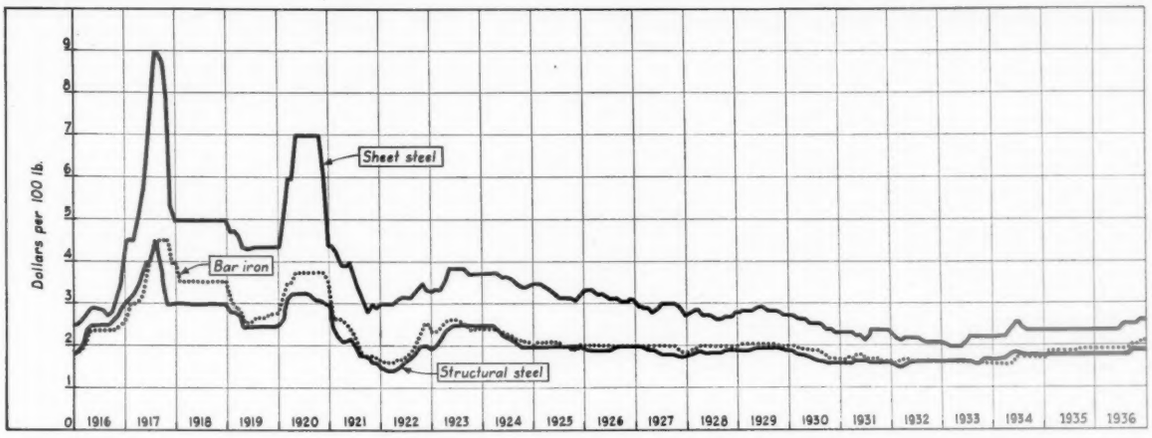
In almost every year, with the possible exception of 1933 when lumber prices were arbitrarily fixed under authority of the NRA, lumber prices fluctuate and the prices at which railway purchases requirements vary widely, as a consequence of the differences in production costs between territories and the sizes, lengths and grades taken, and also the quantities purchased and the time allowed for delivery. Last year was no exception in this respect. Prices were mixed, with some roads paying less for lumber last fall than earlier in the year and other roads paying more. In most instances, however, prices were from $1 to $7 per MBM higher than in 1935 and reflect an average increase of 15 per cent above 1935.

Advances of 15 per cent in southern yellow pine for general railroad use, most of which occurred in the last half of 1936, are attributed altogether to an enlarged demand for lumber. Producers in that territory have not been handicapped by the labor conditions confronting other manufacturers, although wages in southern mills have been advanced somewhat in line with the increasing prices of lumber. On the West Coast, conditions were complicated last year by a severe strike of longshoremen which spread to lumber mills and caused

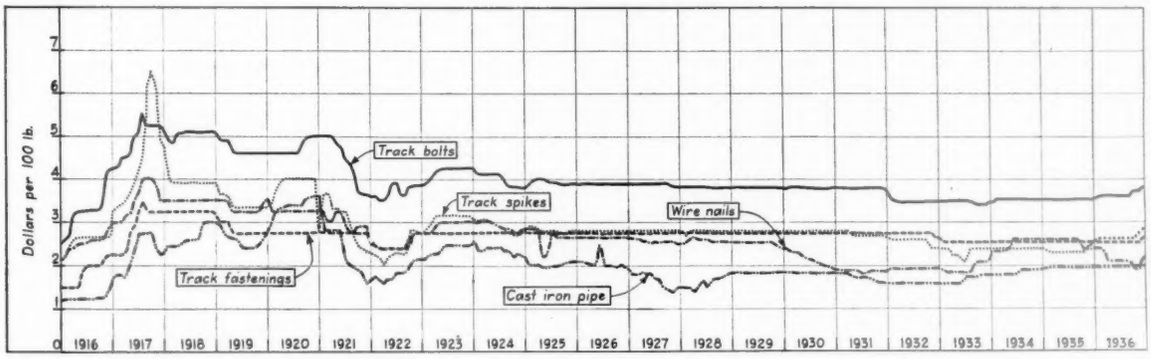


Trend of Pig Iron and Scrap Prices 1918-1936

Iron and Steel Prices, 1916-1936



Track Materials 1916-1936



complete shutdowns for weeks. The effects have been to exhaust stock piles and put a premium on many grades of lumber.

It is noteworthy that construction contracts and home building in 1936 showed a 60 per cent increase over the previous year; that every railroad is undertaking or contemplating definite programs for increasing rolling stock by building new cars or repairing old equipment; and that all mills face the advisability of making adjustments in wages and working conditions to avoid further trouble with labor. The feeling is general among the railroads, therefore, that lumber costs will again advance this year. With prices already within 5 per cent of 1929, such increases will wipe out reductions made during the seven years of the depression in that business. It may not be overlooked, however, that the competition that most railroads can have for the asking in buying lumber and the competition which the lumber industry gets from the steel industry in providing materials for new railroad cars is a deterrent to unreasonable prices.

Higher Prices in Canada

The situation in British Columbia invites attention both because it approximates conditions on the West Coast and also for the light thrown on the operation of the reciprocal trade agreements permitting lumber, among other commodities, to be imported into the States. That section continues to await the restoration of its domestic market for lumber, but with the latest available figures showing a gain of 60 per cent over 1935 in exports, it is estimated that exports of lumber from British Columbia in 1936 reached on all-time record of 1,000,000,000 ft. Exports for consumption in the United States from British Columbia totaled about 250,000,000 ft., or about half the consumption of Canadian lumber in this country in 1929.

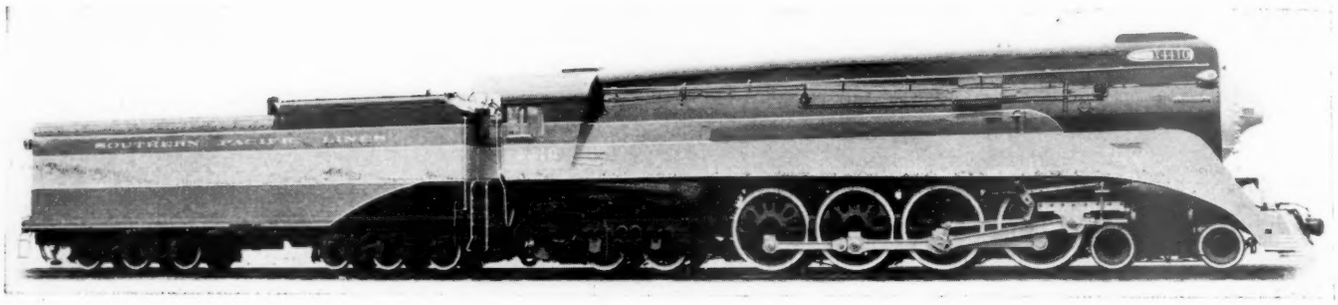
Changes in lumber prices in British Columbia were negligible until about March, 1935, when common timber could be purchased at from $12 to $14. But from that time prices increased, with the result that timber which sold for $13 last spring is now quoted at $17. Toward the close of the year, the demand for clear lumber in British Columbia weakened somewhat; for example, 1 by 4 by 9 kiln-dried car sheathing fell from a high of $33 to $28 and rough green clear for car lining dropped from a high of $30 to $26. With heavy programs for car work facing the Canadian roads and American consumers of Canadian car lumber, this weakness in clear stock in that section is regarded as temporary. Lumber prices are definitely up.

Ties Back to 1929 Prices

After several years of drastic curtailment in tie renewals, the railroads entered the market more heavily in 1936, and for the first time in many years numerous roads were compelled to go off line to complete their requirements for their 1937 and 1938 programs. Railroads with ample supplies along their road, particularly those obtaining ties from farmers, generally were able to obtain softwood ties for several months in 1936 without increases in price. In one instance, fir ties that cost 73 cents in 1935 were purchased for 50 cents in 1936, but the same road paid 75 cents for pine ties last year that were obtained for 50 cents in 1935; while another road that obtained its pine ties for 90 cents last spring paid 10 cents more for them last October. Some roads obtained oak ties 5 cents under 1935, and other roads paid as much more. In general prices averaged higher and, with easy federal money still prevailing in the South and with labor trouble interfering with production on the West Coast, combined with increased tie buying, practically all of the railroads expect some further increase in tie prices during the present year.

Lead is one commodity whose price has increased al-

(*Continued on page 78*)



One of Six Streamlined Passenger Locomotives Built for the Southern Pacific by the Lima Locomotive Works—These Locomotives Have a Total Weight of 821,280 Lb. (Engine and Tender) and a Tractive Force, With Booster, of 74,710 Lb.

Locomotives Ordered in 1936

Domestic total of 533 is more than six times 1935's 87 and exceeds combined volume of five previous years

By Walter J. Taft

Associate Editor

MORE locomotives were ordered during 1936 for domestic service in the United States than were purchased throughout the five previous years, 1931 to 1935. The total—533—also exceeds 1930's 440 by 93, and is equal to more than six times the revised total of 87 locomotives ordered in 1935.

The 1936 orders included 434 steam locomotives, 24 electric locomotives and 75 of other types, such as Diesel-electric, gasoline-electric, etc. The comparable 1935 figures were: Steam, 28; electric, 7; other types, 52. Included among the Diesel-electrics are locomotives for streamlined trains, where such are exclusively power units with no space for handling revenue traffic. Where the latter is present these power units are classified as rail motor cars, and tabulated in the article on orders for passenger equipment. The recalculation of 1935 motor-train orders on this new basis, which is outlined in detail in the passenger-train car article, caused the revision of the 1935 total of locomotives ordered for domestic service upward from the 83 reported last year to the 87 now shown in the accompanying Table II.

Table I—Locomotive Orders in 1936

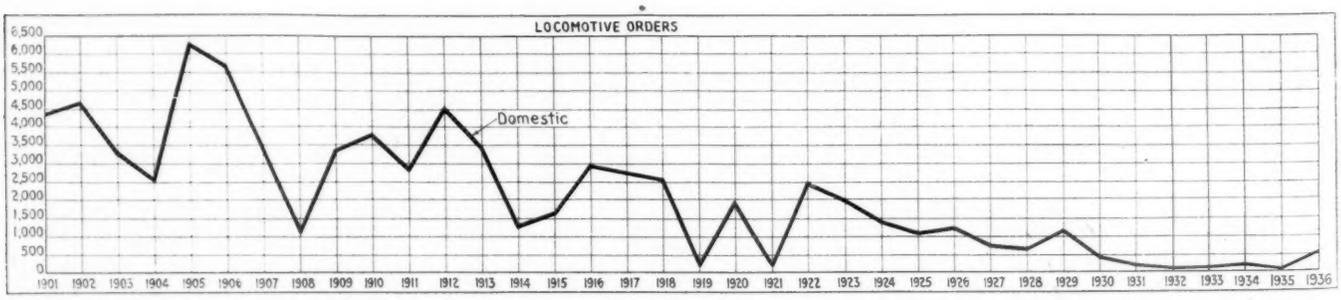
For service in the United States	533
For export to other countries	22
For service in Canada	1
Grand total	556

Last year's largest locomotive order—that of the New York Central for 100 steam locomotives—was also the largest single order for that type of motive power reported since 1930. Next came the Southern Pacific's orders for 46 locomotives; those of the Union Pacific for 38; the Chicago, Milwaukee, St. Paul & Pacific, 32; the Atchison, Topeka & Santa Fe, 28; and the Bessemer & Lake Erie, 27.

Twenty-two locomotives—17 steam and 5 electrics—were ordered in the United States last year for export. This compares with the 15 locomotives—13 steam and two Diesel-electrics—ordered here for export in 1935; and with 1934 export orders for 17 locomotives.

Canadian roads ordered from builders in that country only one locomotive in 1936 as compared with 27 in 1935 when government loans provided the stimulus. No locomotives were ordered in Canada in 1934 or 1933, while in 1932 only an export order for one locomotive was reported.

Locomotives built during 1936 for domestic service in



Locomotive Orders from 1901 to 1936

the United States, as distinguished from those ordered, totaled 157, as compared with 184 in 1935 and 91 in 1934. Production in the United States for export during 1936 totaled 22 locomotives, as compared with the 17 locomotives built here for export during 1935. In Canada 23 locomotives were built in 1936, as compared

(*Continued on page 82*)

Table II—Orders for Locomotives Since 1901

Domestic Orders Only

Year	Locomotives	Year	Locomotives
1901	4,340	1908	1,182
1902	4,665	1909	3,350
1903	3,283	1910	3,787
1904	2,538	1911	2,850
1905	6,265	1912	4,515
1906	5,642	1913	3,467
1907	3,482	1914	1,265

Domestic and Foreign

Year	Domestic	Canadian	U. S. Export	Total
1915	1,612	...	850	2,462
1916	2,910	...	2,983	5,893
1917	2,704	...	3,438	6,142
1918	2,593	209	2,086	4,888
1919	214	58	898	1,170
1920	1,998	189	718	2,905

Domestic and Foreign—(*Continued*)

Year	Domestic	Canadian	U. S. Export	Total
1921	239	35	546	820
1922	2,600	68	131	2,799
1923	1,944	82	116	2,142
1924	1,413	71	142	1,626
1925	1,055	10	209	1,274
1926	1,301	61	180	1,542
1927	734	58	54	846
1928	603	98	27	728
1929	1,212	77	106	1,395
1930	440	95	20	555
1931	176	2	28	206
1932	12	1 (Export)	1	14
1933	42	...	7	49
1934	183	...	17	200
1935	87*	27	15	129*
1936	533	1	22	556

Prior to 1918, Canadian orders included under "Domestic."
* Revised to include locomotives for articulated or partially articulated trains.

Steam Locomotive Orders in 1936

For Service in the United States

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Aliquippa & Southern	1	0-8-0	Sw.	231,000	58,300	25 x 28	August	December	American
Alton & Southern	1	2-8-2	Freight	346,610	64,300	25 x 30	April	October	Baldwin
Atchison, Topeka & Santa Fe	1	4-8-4	Pass.	476,000	66,000	28 x 32	September	Apr., '37	Baldwin
	1	4-6-4	Pass.	409,000	48,300	23½ x 29	September	Apr., '37	Baldwin
	10	4-8-4	Pass.	476,000	66,000	28 x 32	November	Apr., '37	Baldwin
	5	4-6-4	Pass.	409,000	48,300	23½ x 29	November	Apr., '37	Baldwin
	10	2-10-4	Freight	.....	93,000	30 x 34	November	May, '37	Baldwin
Baltimore & Ohio	1	4-4-4-4	Pass.	386,500	65,000	18x26½ (4 cyl)	September	July, '37	Company Shops
Bauxite & Northern	1	0-6-0	Sw.	159,500	34,000	21 x 26	November	1937	Lima
Bessemer & Lake Erie	10	2-10-4	Freight	523,550	109,935†	31 x 32	April	July-Sep.	Baldwin
	4	0-8-0	Sw.	279,000	64,309	25 x 30	April	July-Aug.	American
	10	2-10-4	Freight	520,000	.....	31 x 32	December	1937	American
	2	0-8-0	Sw.	279,000	.....	25 x 30	December	1937	American
Boston & Maine	5	4-6-2	Pass.	339,000	52,800†	23 x 28	November	Feb., '37	Lima
	5	4-8-2	Freight	415,500	67,000	28 x 31	November	Apr., '37	Baldwin
Butler Brothers, Inc.	2	0-6-0	Sw.	162,000	39,860	22 x 26	Dec. '35	Apr., '36	Porter
Chicago, Burlington & Quincy	3	4-8-4	Freight	454,600	80,700†	28 x 30	.....	Sept.-Oct.	Company Shops
	10	4-8-4	.....	.....	.....	.....	December	1937	Company Shops
Chicago, Milwaukee, St. Paul & Pac.	1	4-4-2	Pass.	256,000	30,700	19 x 28	January	May	American
	1	4-4-2	Pass.	256,000	30,700	19 x 28	November	Apr., '37	American
	30	4-8-4	Freight	468,000	68,331	26 x 32	November	Aug., '37	Baldwin
Conemaugh & Black Lick	3	0-8-0	Sw.	231,000	58,300	25 x 28	August	December	American
Denver & Rio Grande Western	10	4-6-6-4	Freight	.....	.....	.....	November	May, '37	Baldwin
	5	4-8-4	Pass.	.....	.....	.....	November	May, '37	Baldwin
Detroit & Toledo Shore Line	3	2-8-2	Freight	323,000	54,000	26 x 30	October	December	Lima
Electro Metallurgical Co.	1	0-6-0	Sw.	167,000	36,000	21 x 26	February	May	Baldwin
Great Lakes Steel Corp.	1	0-6-0	.....	146,000	.....	.....	March	.....	Porter
Green Bay & Western	3	2-8-2	Freight	287,000	48,000	22 x 30	October	Jan., '37	American
Kansas City Southern	10	2-10-4	Freight	511,000	93,000	27 x 34	November	1937	Lima
Kewaunee Green Bay & Western	1	2-8-2	Freight	287,000	48,000	22 x 30	October	Jan., '37	American
Lehigh & New England	1	0-6-0	Sw.	183,900	44,200	21 x 28	February	May	Baldwin
Louisiana & Arkansas	2	2-8-2	Freight	292,000	71,300†	23 x 32	April	August	Lima
	3	2-8-2	Freight	288,000	54,800	23 x 32	April	September	Lima
Monnessen Southwestern	1	0-6-0	Sw.	181,000	45,100	22 x 28	August	.....	American
New York Central	50	4-6-4	.....	357,000	.....	22½ x 28	November	1937	American
New York Central (P. & L. E.)	50	0-8-0	Sw.	230,400	55,400	25 x 28	November	1937	Lima
New York, New Haven & Hartford	10	4-6-4	Pass.	350,000	44,000	22 x 30	June	Jan.-Feb., '37	Baldwin
Norfolk & Western	5	2-8-8-2	Freight	582,900	126,838	25.39x32 (4 cyl)	March	Sept.-Dec.	Company Shops
	8	2-6-6-4	Freight	.....	.....	.....	December	1937	Company Shops
Northern Pacific	12	4-6-6-4	Freight	631,000	104,300	23 x 32 (4 cyl)	March	Nov.-Dec.	American
Pittsburgh & West Va.	2	2-6-6-4	Freight	532,000	97,500	23 x 32 (4 cyl)	July	December	Baldwin
	2	2-6-6-4	Freight	532,000	97,500	23 x 32 (4 cyl)	October	Feb., '37	Baldwin
Richmond, Fredericksb. & Pot.	4	4-8-4	Fr. & Pass.	461,500	66,500	27 x 30	July	Feb., '37	Baldwin
	1	4-8-4	Fr. & Pass.	473,000	82,700†	27 x 30	July	Feb., '37	Baldwin
Seaboard Air Line	5	2-6-6-4	Freight	.....	82,300	22 x 30 (4 cyl)	December	Apr., '37	Baldwin
Southern Pacific	14	4-8-4	Pass.	455,200	76,650†	26 x 32	December	1937	Lima
	10*	Tenders	.....	.....	.....	.....	December	1937	Lima
	14	4-8-8-2	Pass. & Fr.	642,410	123,400	24 x 32 (4 cyl)	December	May, '37	Baldwin
	12	4-8-8-2	Fr. & Pass.	642,500	123,400	24 x 32 (4 cyl)	June	Jan., '37	Baldwin
	6	4-8-4	Pass.	445,200	74,710†	27 x 30	June	Jan., '37	Lima
Standard Steel Works Co.	1	0-4-0	Sw.	110,000	22,400	16 x 24	July	October	Baldwin
Texas & New Orleans	2	0-8-0	Sw.	232,000	55,920	25 x 30	January	May	Company Shops
Toledo, Peoria & Western	6	4-8-4	.....	365,000	.....	23½ x 30	August	1937	American
Union Carbide Co.	1	0-4-0	Sw.	86,000	18,950	15 x 24	February	April	Baldwin
Union Railroad Company	5	0-6-0	Sw.	201,400	64,188†	22 x 28	April	June	Lima
	5	0-10-2	Sw.	404,360	108,034†	28 x 32	April	July	Baldwin
	4	0-10-2	Sw.	.....	.....	.....	December	1937	Baldwin
Union Pacific	15	4-6-6-4	Freight	566,000	97,300	22 x 32 (4 cyl)	February	.....	American
	20	4-8-4	Pass.	465,000	63,500	24½ x 32	October	.....	American
	1‡		Pass.	486,000	76,500	.....	July	.....	G. E.-Co Shops
Western Pacific	7	4-6-6-4	.....	.....	.....	.....	December	1937	American
	4	2-8-8-2	.....	.....	.....	.....	December	1937	Baldwin
Wheeling & Lake Erie	10	2-8-4	Freight	431,000	64,100	25 x 34	November	Apr., '37	American

Canada

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Sydney & Louisburg	1	4-6-2	Freight	174,000	35,000	21 x 28	October	November	Bir. R. & Loc.

* Not included in totals.
† Tractive force including booster.
‡ Steam turbine electric of two units, each of 2500 hp. and 4-6-6-4 wheel arrangement.

Export

Purchaser	No.	Type	Service	Weight	Tractive force	Cylinders	Date of order	Date of delivery	Builder
Interoceanic Ry. of Mexico	5	2-8-0	.....	119,000	.....	18 x 22	February	.....	American
International Petroleum Co.	1	0-4-0	Sw.	37,500	8,250	11 x 16	April	July	Baldwin
Mexican National Construction Co.	2	2-6-6-2	.....	216,000	.....	15 x 22	August	.....	American
Norton, Megaw & Co., Ltd.	2	4-6-2	Pass.	116,000	18,500	17 x 24	June	November	Baldwin
	1	4-6-2	Pass.	116,000	18,500	17 x 24	September	Jan., '37	Baldwin
Enyati Colliery Ltd.	1	2-10-2	Freight	186,000	31,500	19 x 24	July	November	Baldwin
United Fruit Co.	5	2-8-2	Freight	145,000	27,265	18 x 22	September	November	Baldwin

Electric Locomotives

For Service in the United States

Purchaser	No.	Wheel arrangement	Service	Weight	Horsepower cont. rating	Date of order	Date of delivery	Builder
Inland Lime Stone Co.	1	B-B	Quarry	110,000	1,040	January	August	West. Elec.-Differ'tial
Pennsylvania	1	1-D-1	Freight	365,000	5,000	November	1937	G.E.Elec.-West-Co.Sh.
Pocahontas Corp	1	B	Mine	40,000	220	February	May	West.-Baldwin
Springfield Terminal Ry.	1	B-B	Sw.	100,000	460	July	August	West.-Baldwin
Tennessee Coal Iron & R.R. Co.	7	B	.....	45,330	300	November	Jan., '37	West.-Baldwin
Utah Copper Co.	12	1-B+B-1	Freight	150,000	877	October	Jan.-Mar., '37	General Electric
Youngstown & Suburban	1	B-B	Sw.	100,000	460	September	September	West.-Baldwin

Export

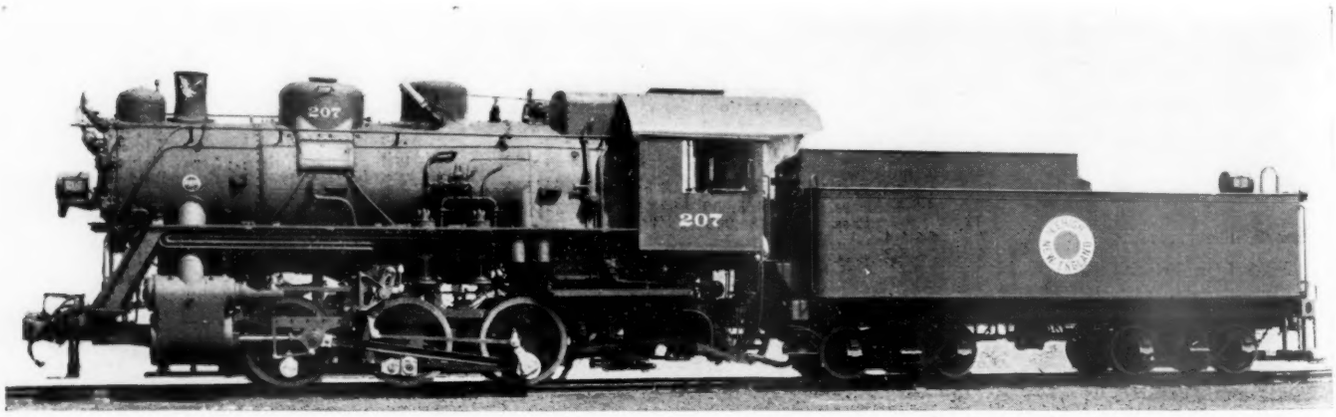
Purchaser	No.	Wheel arrangement	Service	Weight	Horsepower cont. rating	Date of order	Date of delivery	Builder
Beth-Chili I.M. Co.	3	B-B	Sw.	120,000	320	July	December	General Electric
Int. Nickel Co. of Can.	2	B-B	Freight	130,000	...	July	November	General Electric

Diesel-Electric, Gas-Electric and Other Internal-Combustion Locomotives

For Service in the United States

Purchaser	No.	Wheel arrangement	Service	Type	Weight	Horse-power	Date of order	Date of delivery	Builder
Aluminum Co. of America	1	..	...	Diesel-Elec.	.....	600	November	1937	American
Atchison, Topeka & Santa Fe	1	B-B	Sw.	Diesel-Elec.	194,700	600	January	July	Electro-Motive
Baltimore & Ohio	2	C-C	Pass.	Diesel-Elec.	540,000	3,600	July	Feb.-Mar., '37	Electro-Motive
	1	B-B	Sw.	Diesel-Elec.	200,000	600	November	December	Electro-Motive
Bessemer & Lake Erie	1	B-B	Sw.	Diesel-Elec.	143,500	530	April	July	Westinghouse
Birmingham Southern	5	B-B	Sw.	Diesel-Elec.	230,000	900	October	Jan., '37	West.-American
	5	B-B	Sw.	Diesel-Elec.	250,000	900	September	Jan., '37	West.-Electro M.
Boston & Maine	3	B-B	Sw.	Diesel-Elec.	200,000	600	June	July	Electro-Motive
Chicago, Burlington & Quincy	2‡	B-B	Pass.	Diesel-Elec.	427,940	3,000	Nov.-Dec.,'35	Oct.-Dec.	G.E.-Electro-Motive
	2	B-B	Pass.	Diesel-Elec.	221,260	1,800	Dec., '35	October	G.E.-Electric-Motive
Chicago Great Western	1	B-B	Sw.	Diesel-Elec.	226,000	800	January	January	Westinghouse
	2	B-B	Sw.	Diesel-Elec.	228,000	800	April	Apr.-May	Westinghouse
	3	B-B	Sw.	Diesel-Elec.	200,000	600	June	August	G.E. Electro-Motive
Chicago, Rock Island & Pacific	6	B-B	Pass.	Diesel-Elec.	210,000	1,200	November	June, '37	G.E. Electro-Motive
Great Lakes Steel Co.	3	B-B	Sw.	Diesel-Elec.	140,000	530	July	.....	West.-Baldwin
Gulf Refining	1	B-B	Sw.	Diesel-Elec.	90,000	290	September	.....	West. Por.-Her.
Joplin-Pittsburgh	1	B-B	Sw.	Propane-Elec.	130,000	500	February	October	West.-Ply.-Climax
LaSalle & Bureau County	1	B-B	Sw.	Gas-Elec.	144,000	500	February	August	West.-Ply.-Climax
Milwaukee Coke & Gas Co.	1	B-B	Sw.	Diesel-Elec.	120,000	400	September	December	G.E.-Inger.-Rand
Monongahela Connecting	1	B-B	Sw.	Diesel-Elec.	159,000	550	January	June	G.E.-Cooper-Bess.
	1	B-B	Sw.	Diesel-Elec.	218,000	1,000	October	Feb., '37	G.E.-Cooper-Bess.
New York Central	7	B-B	Sw.	Diesel-Elec.	202,000	600	April	July	G.E.-Electro-Motive
New York, New Haven & Hartford	5	B-B	...	Diesel-Elec.	199,000	600	Dec., '35	Sept.-Nov.	G.E.-Ing.-Rand
	5	B-B	...	Diesel-Elec.	199,000	660	Dec., '35	Sept.-Nov.	G.E.-Cooper-Bess.
Portland Terminal	3	B-B	Sw.	Diesel-Elec.	200,000	600	June	July	American
Union Pacific	1	..	...	Diesel-Elec.	.....	3,600	July	.....	Electro-Motive
	1	..	...	Gasoline	.....	...	July	.....	Baldwin
Union Pac.-So. Pac.-C. & N. W.	1†	..	Pass.	Diesel-Elec.	.....	5,400	December	.....	Electro-Motive
Union Pacific-C. & N. W.	1†	..	Pass.	Diesel-Elec.	.....	5,400	December	.....	Electro-Motive
Universal Atlas Cement	1	B-B	Sw.	Diesel-Elec.	200,000	600	September	December	G.E.-American
U. S. Army	2	B	Sw.	Gas-Elec.	60,000	225	April	.....	West. Atlas-LeRoi
Westinghouse Elec. & Mfg. Co.	3	B-B	Sw.	Diesel-Elec.	150,000	530	August	December	West.-Baldwin
Wichita Valley	1	B-B	Frt. & Sw.	Diesel-Elec.	170,000	900	January	December	Cummins-G.E. Traction

‡ Each of two units.
† Each of three units.



A Heavy Six-Wheel Switcher Built by Baldwin Locomotive Works for the Lehigh & New England

Freight Cars Ordered in 1936

Total of 67,544 three and one-half times last year's business, is also best since 1929—Low volume in Canada

By Frank W. Kraeger

Associate Editor

FREIGHT cars ordered last year for domestic service in the United States totaled 67,544—a better volume than that of any other year since 1929 and more than three and one-half times the 18,699 cars ordered during 1935. The 1936 figure is in fact nearly 10,000 cars in excess of the total number ordered during the entire five-year period, 1931 to 1935, inclusive; and—to make pre-depression comparisons—it exceeds 1928's 51,200 by more than 16,300 cars and 1926's 67,029 by 500.

Furthermore this long-awaited revival has come to the freight car markets in such a way as to give outside builders 80 per cent of the business as compared with the 60 per cent which they received in 1935. Out of the 67,544 cars ordered last year only about 13,500 or 20 per cent were placed in railroad shops, whereas, in 1935, railroad shop orders accounted for 7,500 cars or 40 per cent of that year's 18,699.

The Chesapeake & Ohio was the largest 1936 buyer of freight cars, having placed orders for a total of 7,450. Other large purchasers were: Norfolk & Western, 6,100; Southern Pacific, 4,975; Pacific Fruit Express, 4,700; Bessemer & Lake Erie, 4,000.

Table I—Freight Car Orders in 1936

For service in the United States	67,544
For service in Canada	271
For export to other countries	526
Grand total	68,341

Manifesting the same general trend as domestic orders export business last year was nearly five times the 1935 volume. The figures are 526 compared with 110. Aside from 1934, when 1,323 freight cars were ordered here for export, the 1936 figure is the best since 1930.

On the other hand, the low volume in Canada was in marked contrast to the upturn in the United States. There Canadian roads ordered only 271 freight cars last year as compared with the 2,421 ordered during 1935 when government loans were available to the railroads. In 1934 orders were placed in Canada for 12 freight cars, while the 1933 total was 75.

Freight cars built during 1936 for domestic service in the United States totaled 45,822, or nearly seven times the production in 1935 when 6,933 cars were built. Production here last year for export totaled 493 cars as compared with 888 in 1935. In Canada 1,800 cars were built in 1936 as compared with 801 in the previous year.

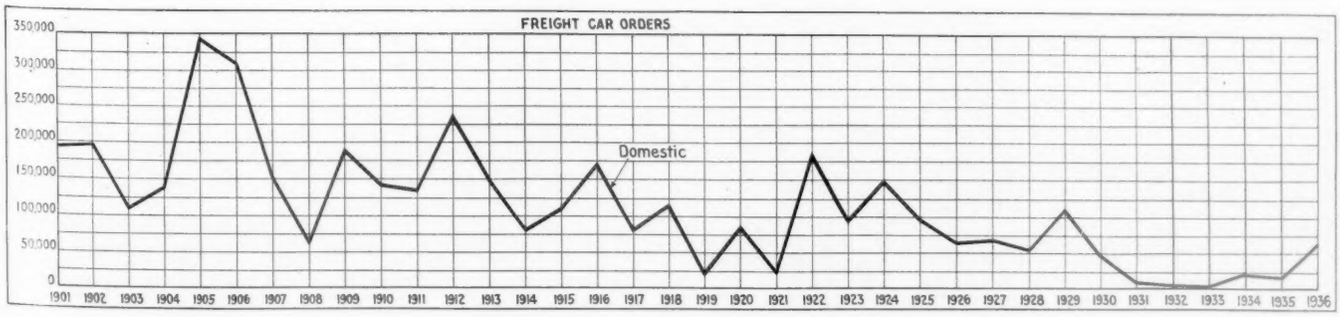
Table II—Orders for Freight Cars Since 1901

Domestic Orders			
Year	Freight cars	Year	Freight cars
1901	193,439	1908	62,669
1902	195,248	1909	189,360
1903	108,936	1910	141,024
1904	136,561	1911	133,117
1905	341,315	1912	234,758
1906	310,315	1913	146,732
1907	151,711	1914	80,264

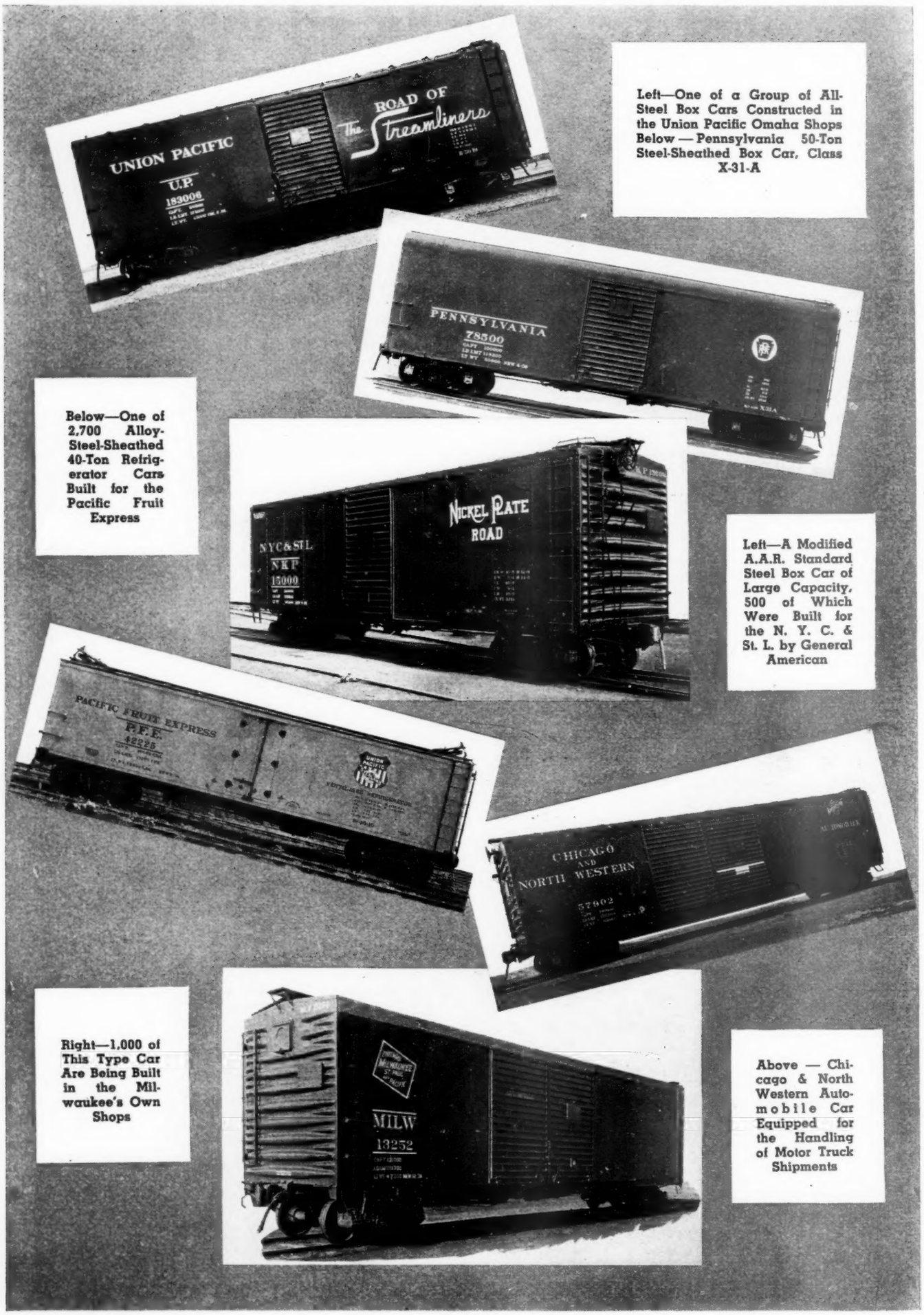
Domestic and Foreign				
Year	Domestic	Canadian	Export	Total
1915	109,792	.....	18,222	128,014
1916	170,054	.....	35,314	205,368
1917	79,367	.....	53,191	132,558
1918	114,113	9,657	53,547	177,317
1919	22,062	3,837	3,994	29,893
1920	84,207	12,406	9,056	105,669
1921	23,346	30	4,982	28,358
1922	180,154	746	1,072	181,972
1923	94,471	8,685	396	103,552
1924	143,728	1,867	4,017	149,612
1925	92,816	642	2,138	95,596
1926	67,029	1,495	1,971	70,495
1927	72,006	2,133	646	74,785
1928	51,200	8,901	2,530	62,631
1929	111,218	9,899	3,023	124,140
1930	46,360	1,936	1,200	49,496
1931	10,880	3,807	151	14,838
1932	1,968	501	77	2,546
1933	1,685	75	132	1,892
1934	24,611	12	1,323	25,946
1935	18,699	2,421	110	21,230
1936	67,544	271	526	68,341

Prior to 1918, Canadian orders included in "Domestic."

The foregoing production figures should not be confused with the totals of orders placed. Nor are they comparable with the figures on the number of cars in-



Freight Car Orders from 1901 to 1936



Left—One of a Group of All-Steel Box Cars Constructed in the Union Pacific Omaha Shops Below — Pennsylvania 50-Ton Steel-Sheathed Box Car, Class X-31-A

Below—One of 2,700 Alloy-Steel-Sheathed 40-Ton Refrigerator Cars Built for the Pacific Fruit Express

Left—A Modified A.A.R. Standard Steel Box Car of Large Capacity, 500 of Which Were Built for the N. Y. C. & St. L. by General American

Right—1,000 of This Type Car Are Being Built in the Milwaukee's Own Shops

Above — Chicago & North Western Automobile Car Equipped for the Handling of Motor Truck Shipments

stalled as reported in statistics issued by the Association of American Railroads.

The appended tables contain a detailed statement of orders for new freight cars, or those having new bodies, placed during 1936 by railroads and industrial concerns; also those placed in Canada and for export. The list of orders was compiled from information furnished to the *Railway Age* by the railroads, private car lines, and other purchasers of cars, in response to requests for this information. The data thus furnished were then checked against lists of orders supplied by the car builders, and amplified accordingly, and also against the weekly reports of orders appearing in the Equipment and Supplies column of the *Railway Age*. The production figures were secured in response to requests to the car builders for this information. As in former years the *Railway Age* is especially indebted to the American Railway Car Institute for its assistance in making available reports of the companies affiliated with that organization.

Table II.—Freight Cars Built in 1936

	United States	Canada	Total
Domestic	45,822	1,800	47,622
Foreign	493	....	493
Total	46,315	1,800	48,115

Comparison with Previous Years

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1899	117,982	1,904	119,886	1906*	236,451	7,219	240,503
1900	113,070	2,561	115,631	1907*	280,216	9,429	284,188
1901	132,591	4,359	136,950	1908*	75,344	1,211	76,555
1902	161,747	2,800	162,599	1909*	91,077	2,493	93,570
1903	153,195	1,613	152,801	1910*	176,374	4,571	180,945
1904	60,955	1,995	60,806	1911*	68,961	3,200	72,161
1905*	162,701	5,305	165,155	1912†	148,357	4,072	152,429

Year	United States Domestic	United States Foreign	United States Total	Canadian Domestic	Canadian Foreign	Canadian Total	Grand total
1913	176,049	9,618	185,667	22,017	....	22,017	207,684
1914	97,626	462	98,088	6,453	....	6,453	104,451
1915	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916	111,516	17,905	129,421	.....	....	5,580	135,001
1917	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918	67,063	40,981	108,044	14,704	1,960	16,664	124,708
1919	94,981	61,783	156,764	6,391	30	6,421	163,185
1920	60,955	14,480	75,435	.....	....	.....	.....
1921	40,292	6,412	46,704	8,404	745	9,149	55,853
1922	66,289	1,126	67,415	458	100	558	67,973
1923	175,748	2,418	178,166	.....	....	.....	.....
1924	113,761	1,141	114,902	1,721	....	1,721	116,623
1925	105,935	3,010	108,945	.....	....	.....	.....
1926	88,862	2,771	91,633	1,645	....	1,645	93,278
1927	63,390	1,087	64,477	2,851	....	2,851	67,328
1928	46,060	938	46,998	5,158	....	5,158	52,156
1929	82,240	3,168	85,408	8,557	....	8,557	93,965
1930	75,188	1,909	77,097	6,923	....	6,923	84,020
1931	13,205	409	13,614	4,633	....	4,633	18,247
1932	3,254	82	3,336	.....	....	.....	3,336
1933	2,160	151	2,311	550	....	550	2,861
1934	25,176	151	25,327	.....	....	.....	25,327
1935	6,933	888	7,821	801	....	801	8,622
1936	45,822	493	46,315	1,800	....	1,800	48,115

* Includes Canadian output.

† Includes Canadian output and equipment built in company shops.

The *Railway Age* is not sufficiently optimistic to believe that the lists can include all the orders placed or that the figures of production are of scientific accuracy. However, it is believed that such omissions as occur will be found to be small and unimportant, and will not vitiate the value of the figures, particularly with respect to comparisons with preceding years, which, after all, is the primary purpose of the compilations.

Freight Car Orders in 1936

For Service in the United States

Purchaser	No.	Class	Capacity	Length, ft.	Length, in.	Construction	Weight	Date of order	Date of delivery	Builder
Alton & Southern	2	Caboose	.....	.....		.....	.....	1936	1936	Company Shops
Aluminum Co. of America	50	Cov. hopper	140,000	44	0	Steel	60,400	July	November	Pullman-Standard
American Refrigerator Transit Co.	511	Refrg.	80,000	33	2¾	Steel Frame	52,000	July	December	Amer. Car & Fdy.
	510	Refrg.	80,000	33	2¾	Steel Frame	52,000	July	December	General American
American Tank Line	15	Tank	100,000	31	10¾	Steel	46,000	September	October	Amer. Car & Fdy.
	5	Tank	80,000	30	2	Steel	42,500	September	October	Amer. Car & Fdy.
Atchison, Topeka & Santa Fe	500	S. S. Box	100,000	40	6	Steel	47,300	February	April-May	Pullman-Standard
	50	Hopper	140,000	41	3	Steel	51,480	April	June	Amer. Car & Fdy.
	10	Cov. Hopper	140,000	29	3	Steel	54,100	September	October	Amer. Car & Fdy.
	1500	S. S. Box	100,000	40	6	Steel	.....	November	1937	Pullman-Standard
	500	S. S. Box	100,000	40	6	Steel	48,800	November	1937	Amer. Car & Fdy.
	300	Gondola	140,000	52	6	Steel	.....	November	Mar., '37	General American
	25	Gondola	140,000	65	6	Steel	.....	November	Mar., '37	General American
	500	Refrigerator	80,000	40	4¾	Steel	.....	November	Mar., '37	General American
	200	Refrigerator	100,000	49	6	Steel	.....	November	Mar., '37	General American
Atlantic States Gas	1	Tank	10,500g	40	5	Steel	71,700	March	May	Amer. Car & Fdy.
Baltimore & Ohio	10	Gondola	80,000	55	3	Steel	48,500	November	November	Company Shops
Bangor & Aroostook	50	Pulp rack	100,000	46	0	Steel	49,300	January	April-May	Magor
Bessemer & Lake Erie	800	Hopper	180,000	40	8	Steel Cor-Ten	48,600	April	June-Aug.	Pullman-Standard
	200	Hopper	180,000	40	8	Steel Cor-Ten	48,600	April	July-Sept.	Pressed Steel
	750	Hopper	140,000	40	8	Steel Cor-Ten	45,500	April	June-Aug.	Amer. Car & Fdy.
	250	Hopper	140,000	40	8	Steel Cor-Ten	45,500	April	July-Aug.	General American
	1000	Hopper	180,000	.....		.....	48,600	December	1937	Pullman-Standard
	500	Hopper	140,000	.....		.....	45,500	December	1937	Amer. Car & Fdy.
	500	Gondola	.....	.....		.....	.....	December	1937	Greenville
Bethlehem Steel Company	100	Hopper	140,000	41	3	Steel	52,500	July	Jan., '37	Company Shops
	200	Gondola	140,000	46	3	Steel	55,400	November	Feb., '37	Company Shops
	25	Gondola	140,000	40	0	Steel	50,000	June	Aug.-Sept.	Company Shops
Birmingham Southern	100	S. S. Box	100,000	40	6	Steel	42,000	August	December	Pullman-Standard
Boston & Maine	750	Gondola	100,000	41	6	Steel	44,000	August	Jan., '37	Bethlehem
Cabot, Inc., Godfrey L.	10	Sp. Hopper	70,000	45	10	Steel	53,300	November	1937	Pressed Steel
Calco Chemical Co.	1	Tank	40,000	31	11	Steel	47,500	April	July	Amer. Car & Fdy.
California Dispatch Line	5	Tank	8,000g	39	1	Steel	55,400	February	May	Amer. Car & Fdy.
Cambria & Indiana	300	Hopper	100,000	33	0	Steel	41,000	August	November	Amer. Car & Fdy.
Canfield Tank Line	3	Tank	80,000	.....		Steel	38,000	April	May	Amer. Car & Fdy.
	2	Tank	80,000	.....		Steel	41,000	May	June	General American
Carbide & Carbon Chemical Corp.	1	Tank	8,000g	37	3	Aluminum	35,100	March	July	Amer. Car & Fdy.
Central of Georgia	200	Hopper	100,000	34	0	Steel	44,000	June	October	Pullman-Standard
Chesapeake & Ohio	1800	S. C. Hopper	100,000	33	0	Steel	40,200	May	November	Amer. Car & Fdy.
	1700	S. C. Hopper	100,000	33	0	Steel	40,200	May	November	Pullman-Standard
	500	S. S. Box	100,000	40	6	Steel	49,800	May	December	Pullman-Standard
	500	S. S. Box	100,000	40	6	Steel	49,800	May	November	General American
	500	F.B.Gondola	100,000	40	6	Steel	43,500	May	November	Bethlehem
	150	F.B.Gondola	100,000	48	6	Steel	48,500	May	October	Bethlehem
	150	S. S. Auto	100,000	40	6	Steel	54,800	May	September	Pullman-Standard
	100	F.B.Gondola	100,000	48	6	St. wood floor	48,500	May	December	Ralston
	500	Gondola	.....	.....		.....	.....	December	1937	Amer. Car & Fdy.
	500	Hopper	.....	.....		.....	.....	December	1937	Amer. Car & Fdy.
	500	Box	.....	.....		.....	.....	December	1937	General American
	500	Hopper	.....	.....		.....	.....	December	1937	Pullman-Standard
	50	Caboose	.....	.....		.....	.....	December	1937	Magor
Chicago & Eastern Illinois	500	Box	100,000	40	6	Steel	49,800	October	Jan., '37	General American

Purchaser	No.	Class	Capacity	Length, ft.	Length, in.	Construction	Weight	Date of order	Date of delivery	Builder
Chicago & North Western	18	Auto	100,000	.....		.....	.....	1936	1936	Company Shops
Chicago, Burlington & Quincy	500	S. S. Box	100,000	.....		Steel Frame	48,000	1936	July-Oct.	Company Shops
	500	Gondola	100,000	.....		Composite	43,100	1936	Mar.-July	Company Shops
	1500	Gondola	.....	.....		.....	.....	December	1937	Company Shops
	1000	Box	100,000	.....		Steel Frame	.....	December	1937	Company Shops
	300	Refrigerator	.....	.....		.....	.....	December	1937	Company Shops
	250	Auto	.....	.....		Steel Frame	.....	December	1937	Company Shops
	250	Hopper	.....	.....		Steel	.....	December	1937	Company Shops
	250	Hopper	110,000	.....		Steel	.....	1936	December	Company Shops
	150	Stock	.....	.....		Steel Frame	.....	December	1937	Company Shops
	100	Flat	.....	.....		.....	.....	December	1937	Company Shops
Chicago Great Western	100	Flat	100,000	52	0	St. Underframe	42,500	May	July	Pullman-Standard
Chicago, Milw., St. Paul & Pacific	500	Auto	100,000	50	6	Steel	.....	April	December	Company Shops
	100	Auto	80,000	40	6	Steel	.....	April	December	Company Shops
	400	Auto	80,000	40	6	Steel	.....	April	Feb., '37	Company Shops
	500	Hopper	100,000	34	0	Steel	.....	April	April, '37	Company Shops
Chicago, Rock Island & Pacific	350	Box	100,000	40	6	Steel	53,000	November	Feb.-Mar., '37	Amer. Car & Fdy.
Chicago West Pullman & Southern	3	Gondola	100,000	41	6	Steel Frame	44,400	May	November	Company Shops
Cincinnati, N. O. & Tex. Pacific	10	Air-dump	30 cu. yd	32	0	Steel	71,500	October	Feb., '37	Pressed Steel
Coltexo Corp.	5	Hopper	80,000	45	10	Steel	49,600	September	November	Amer. Car & Fdy.
	5	Hopper	80,000	45	10	Steel	49,600	November	Jan., '37	Amer. Car & Fdy.
Cornwall Railroad	20	Hopper	140,000	19	10	Steel	40,200	January	May-June	Bethlehem
Delaware & Hudson	25	D. S. Box	80,000	40	6	Steel	44,100	February	September	Company Shops
	50	Hopper	110,000	34	0	Steel Frame	42,800	February	September	Company Shops
	1	Hopper	80,000	28	0	Steel	32,600	June	October	Company Shops
	60	Hopper	110,000	.....		.....	.....	December	1937	Company Shops
Denver & Rio Grande Western	100	Ballast	14,000	.....		Steel	.....	December	1937	Rodger-A. C. & F.
Donora Southern	20	Aut. dump	140,000	45	1¼	Steel	74,000	December	April, '37	Differential
Dow Chemical Co.	4	Tank	8,000g	36	4	Steel	43,900	January	April	Amer. Car & Fdy.
	4	Tank	10,000g	36	4	Steel	47,700	January	April	Amer. Car & Fdy.
	2	Tank	10,000g	36	4	Steel	51,100	January	April	Amer. Car & Fdy.
Dowell, Inc. (Dow Chemical)	3	Tank	8,000g	36	4	Steel	42,100	July	October	Amer. Car & Fdy.
Duluth, Missabe & Northern	1000	Ore	150,000	.....		.....	.....	December	1937	Pullman-Standard
	50	Hopper	.....	.....		.....	.....	December	1937	Ryan
Du Pont de Nemours & Co., E. I.	1	Tank	100,000	36	3	Steel	51,800	March	June	General American
	1	Tank	80,000	32	8½	Steel	52,400	April	June	Amer. Car & Fdy.
	1	Tank	100,000	39	10	Steel	45,200	July	November	General American
	1	Tank	100,000	36	3	Steel	51,800	September	November	Amer. Car & Fdy.
	1	Tank	80,000	32	0	Steel	41,800	September	November	Amer. Car & Fdy.
	9	Tank	100,000	36	3	Steel	43,600	September	November	Amer. Car & Fdy.
	3	Tank	100,000	36	3	Steel	43,600	September	November	General American
	16	Tank	100,000	36	3	Steel	46,000	September	November	General American
	9	Tank	100,000	36	3	Steel	43,600	September	November	General American
	3	Tank	4,132g	28	8	Steel	37,500	January	May	Amer. Car & Fdy.
	7	Tank	5,165g	33	5	Steel	40,600	January	June	Amer. Car & Fdy.
	2	Tank	7,000g	34	10	Steel	46,200	September	November	Amer. Car & Fdy.
	11	Tank	7,000g	.....		Steel	46,500	September	December	Amer. Car & Fdy.
	2	Tank	10,000g	39	9	Steel	55,000	September	November	Amer. Car & Fdy.
	5	Tank	4,200g	29	6	Steel	40,550	September	November	Amer. Car & Fdy.
	15	Tank	7,000g	31	11	Steel	44,930	August	November	Amer. Car & Fdy.
Electro Bleaching Gas Co.	3	Ins. Tank	80,000	32	8½	.....	50,000	February	April	Amer. Car & Fdy.
	3	Ins. Tank	80,000	32	8½	.....	50,000	February	April	General American
Elgin, Joliet & Eastern	750	Gondola	100,000	.....		.....	.....	.....	.....	Mt. Vernon
	200	Hopper	100,000	.....		.....	.....	.....	.....	Mt. Vernon
	100	Gondola	140,000	.....		.....	.....	.....	.....	Mt. Vernon
Erie	500	Box	100,000	40	8	Steel	45,920	February	July-Aug.	Amer. Car & Fdy.
	200	Auto	100,000	41	0	Steel	50,200	February	Aug.-Nov.	Magor
	100	Auto	100,000	41	0	Steel	53,600	February	Aug.-Sept.	Greenville
Ethyl Gasoline Corp.	6	Tank	6,000g	33	7	Steel	54,000	November	Jan., '37	Amer. Car & Fdy.
Fleishman Transportation Co.	5	Tank	.....	.....		Steel Frame	.....	1936	1936	Company Shops
	17	Tank	.....	.....		Steel	.....	1936	1936	Company Shops
	1	Tank	.....	.....		Steel Frame	.....	1936	1936	Company Shops
General Chemical Co.	3	Tank	6,570g	34	7	Steel	67,040	May	September	Amer. Car & Fdy.
	97	Tank	100,000	.....		.....	.....	.....	.....	General American
	28	Tank	140,000	.....		.....	.....	.....	.....	General American
	15	Tank	80,000	.....		.....	.....	.....	.....	General American
Great Northern	500	Ore	150,000	19	10⅞	Steel	42,375	March	July	Amer. Car & Fdy.
	500	Ore	.....	.....		.....	.....	December	1937	Bethlehem
Grt. Western Electro-Chemical Co.	1	Tank	30,000	.....		Steel Frame	.....	September	November	General American
Gulf Coast Lines	200	D. S. Box	80,000	40	6	Steel	43,000	August	November	Mt. Vernon
Gulf Mobile & Northern	250	S. S. Box	100,000	40	6	Steel Frame	45,000	November	Mar., '37	Amer. Car & Fdy.
	50	S. S. Auto	100,000	40	6	Steel Frame	48,000	November	Mar., '37	Amer. Car & Fdy.
	125	Gondola	100,000	41	6	.....	44,000	November	Mar., '37	Amer. Car & Fdy.
Hooker Electr. Chem. Co.	6	Tank	60,000	33	10	Steel	64,160	September	December	Amer. Car & Fdy.
Huber Corp., J. M.	1	Hopper	80,000	45	10	Steel	49,600	July	August	Amer. Car & Fdy.
	1	Hopper	80,000	45	10	Steel	49,600	August	September	Amer. Car & Fdy.
	2	Hopper	80,000	45	10	Steel	49,600	November	December	Amer. Car & Fdy.
Inland Lime & Stone Co.	8	Side Dump	100,000	32	2	Steel	69,000	January	May	Western Austin
International-Great Northern	300	D. S. Box	80,000	40	6	Steel	43,200	February	May-June	Amer. Car & Fdy.
Kansas City Southern	450	D. S. Box	100,000	40	6	Steel	48,000	November	Jan., '37	Pullman-Standard
	300	D. S. Box	100,000	40	6	Steel	48,000	November	Feb., '37	General American
	50	D. S. Box	100,000	50	0	Steel	48,000	November	Jan., '37	Pullman-Standard
	100	Coal	140,000	40	0	Steel	48,000	November	.....	Mount Vernon
	100	Auto	.....	.....		.....	.....	1936	1936	Company Shops
Lehigh & New England	250	Hopper	100,000	33	0	Steel	42,500	July	November	Bethlehem
Lehigh Valley	500	D. H. Coal	100,000	30	0	Steel	39,000	August	December	Company Shops
	250	D. H. Coal	100,000	30	0	Composite	40,500	August	November	Company Shops
	250	D. H. Coal	100,000	33	0	Composite	42,500	August	September	Company Shops
Lennig & Co., Chas.	2	Tank	7,000g	31	10	Steel	42,000	August	October	Amer. Car & Fdy.
	1	Tank	100,000	.....		.....	.....	March	.....	General American
	1	Tank	60,000	.....		.....	.....	March	.....	General American
Magnolia Petroleum Co.	6	Tank	80,000	.....		Steel	43,000	January	April	General American
Maine Central	100	Gondola	100,000	41	6	Steel	44,000	August	Jan., '37	Bethlehem
	500	Box	80,000	40	5	Steel	43,000	August	Jan., '37	Magor
	150	Hopper	100,000	33	0	Steel	41,500	August	December	Bethlehem
Mathieson Alkali Works	2	Tank	60,000	34	6	Steel	64,000	October	Jan., 37	General American
	2	Refrigerator	70,000	43	0	Steel	66,100	January	May	Amer. Car & Fdy.
Merchants Despatch, Inc.	30	Refrigerator	80,000	33	2	Steel	60,900	January	February	Company Shops
	70	Refrigerator	80,000	33	2	Steel	61,200	January	March	Company Shops
	20	Refrigerator	80,000	25	0	Steel	70,600	March	June	Company Shops
	500	Refrigerator	80,000	33	2	Steel	60,000	September	December	M. D. T. Co.
Merrimac Chemical Co.	8	Tank	100,000	.....		Steel Frame	43,000	1936	1936	Amer. Car & Fdy.
	4	Tank	100,000	.....		Steel Frame	43,000	1936	1936	Amer. Car & Fdy.
Minneapolis & St. Louis	65	Hopper	110,000	33	0	Steel	45,000	July	September	General American
	2	Tank	100,000	31	0	Steel	48,000	September	October	General American
Minneapolis, St. P. & S.Ste. Marie	500	D. S. Box	100,000	40	6	Steel	45,400	June	October	Pullman-Standard
Missouri Pacific	1500	S. S. Box	100,000	40	6	Steel	42,000	May	Aug.-Oct.	Mt. Vernon
	500	Hopper	110,000	33	0	Steel	45,600	May	Aug.-Sept.	Amer. Car & Fdy.
	50	Rack	80,000	35	6	Steel	35,300	April	June-July	Company Shops
	396	Flat	80,000	41	3	Steel	39,000	April	July-Aug.	Company Shops
	1*	Snow plow	80,000	46	7	Steel	78,000	August	November	Russell Snow Plow
Monsanto Chemical Co.	1	Tank	7,000g	32	7	Steel	50,400	April	May	Amer. Car & Fdy.
	2	Tank	30,000	42	4	Steel	52,900	April	April	Amer. Car & Fdy.
	2	Tank	8,000g	36	3	Steel	46,430	June	August	Amer. Car & Fdy.
	2	Tank	8,000g	36	4	Steel	46,430	October	November	Amer. Car & Fdy.

* Not included in totals.

Purchaser	No.	Class	Capacity	Length, ft.	Length, in.	Construction	Weight	Date of order	Date of delivery	Builder
Montour	500	Hopper	110,000	30	6	Steel	40,672	November	1937	Pullman-Standard
New York Central	300	H.S.Gondola	140,000	65	6	Steel	63,700	April	July	Company Shops
New York, Chicago & St. Louis	500	S. S. Box	100,000	40	6	Steel	49,800	April	October	General American
	200	F.B.Gondola	100,000	48	6	Steel	49,000	April	September	Bethlehem
	50	Flat	100,000	50	0	St. Underframe	46,400	April	October	Bethlehem
	25	F.B.Gondola	140,000	65	6	Steel	71,000	April	November	Bethlehem
	2	Flat	200,000	50	0	St. Underframe	80,000	April	September	Amer. Car & Fdy.
N. Y., New Haven & Hartford	150	Coal	.....	.....		.....	.....	December	1937	Company Shops
	75	Flat	.....	.....		.....	.....	December	1937	Company Shops
Niacet Chemical Corp.	3	Alum. Tank	80,000	36	8	Steel Frame	35,000	September	October	General American
	2	Alum. Tank	80,000	36	8	Steel Frame	35,000	September	October	Amer. Car & Fdy.
Norfolk & Western	800	D. S. Box	100,000	40	6	Steel	49,700	July	Dec.-Feb., '37	Ralston
	100	D. S. Box	100,000	40	6	Steel	50,000	July	Nov.-Dec.	Magor
	100	D. S. Box	100,000	50	6	Steel	55,000	July	Nov.-Dec.	Greenville
	1000	Hopper	110,000	31	0	Steel	38,800	March	June-Oct.	Company Shops
	500	Hopper	110,000	31	0	Steel	38,800	April	Aug.-Sept.	Pressed Steel
	500	Hopper	110,000	31	0	Steel	38,800	April	Aug.-Sept.	Virginia Bridge
	500	Gondola	.....	.....		Steel	.....	December	1937	Company Shops
	500	Hopper	.....	.....		Steel	.....	December	1937	Company Shops
	1000	Hopper	110,000	.....		Steel	.....	December	1937	Bethlehem
	1000	Hopper	110,000	.....		.....	.....	December	1937	Virginia Bridge
	100	Box	100,000	50	0	Steel	.....	December	1937	Greenville
Norfolk Southern	25	Auto	80,000	.....		.....	.....	December	1937	Magor
North Amer. Car Corp.	40	Tank	4,500g	32	7	Steel	40,500	November	Jan., '37	Amer. Car & Fdy.
	20	Tank	6,000g	33	1	Steel	44,300	November	Jan., '37	Amer. Car & Fdy.
	4	Tank	6,000g	32	7	Steel	40,200	November	Jan., '37	Amer. Car & Fdy.
	15	Tank	6,000g	31	11	Steel	38,100	November	Jan., '37	Amer. Car & Fdy.
Northern Pacific	250	Stock	80,000	.....		.....	.....	February	1936	Company Shops
	250	Flat	.....	.....		.....	.....	July	1936	Company Shops
	500	Gondola	100,000	41	6	Steel	48,500	June	Oct.-Dec.	Pressed Steel
Pacific Fruit Express	400	Refrigerator	80,000	33	2	Steel	53,000	April	Aug.-Nov.	Company Shops
	300	Refrigerator	80,000	33	2	Steel	53,100	April	Aug.-Oct.	Company Shops
	500	Refrigerator	80,000	33	2	Steel	53,200	April	Aug.-Nov.	Pac. Car & Fdy.
	500	Refrigerator	80,000	39	11	Steel	53,300	April	Aug.-Sept.	General American
	500	Refrigerator	80,000	33	2	Steel	53,000	April	Aug.-Sept.	Pullman-Standard
	500	Refrigerator	80,000	33	2	Steel	52,800	April	Aug.-Sept.	Amer. Car & Fdy.
	500	Refrigerator	80,000	33	2	Steel	53,200	November	.....	Amer. Car & Fdy.
	500	Refrigerator	80,000	39	11	Steel	.....	November	Apr., '37	General American
	500	Refrigerator	80,000	33	3	Steel	52,900	November	1937	Pullman-Standard
	500	Refrigerator	.....	.....		.....	.....	December	1937	Pac. Car & Fdy.
Panama Canal	6	Ballast	.....	.....		.....	.....	February	1936	Haffner-Thrall
The Pennsylvania	1	Box	100,000	40	6	Steel	41,600	June	September	Company Shops
	1	Flat	100,000	70	0	Steel	47,150	October	December	Company Shops
Pennsylvania Salt Mfg. Co.	3	Tank	50,000	42	7	Steel	75,500	January	April	Amer. Car & Fdy.
	6	Tank	7,000g	31	11	Steel	42,000	April	July	Amer. Car & Fdy.
	2	Tank	4,000g	28	8	Steel	36,520	July	August	Amer. Car & Fdy.
	3	Tank	30,000	42	4	Steel	.....	August	September	Amer. Car & Fdy.
	3	Tank	60,000	33	10	Steel	64,160	October	Jan., '37	Amer. Car & Fdy.
	2	Tank	60,000	33	7	Steel	55,000	November	November	Amer. Car & Fdy.
	1	Tank	4,000g	28	8	Steel	36,520	November	Jan., '37	Amer. Car & Fdy.
Pere Marquette	400	S. S. Auto	80,000	40	6	Steel	54,800	May	October	Ralston
	100	S. S. Furn.	80,000	50	6	Steel	61,000	May	November	Ralston
Philadelphia Quartz Co. of Cal.	3	Tank	8,000g	36	4	Steel	43,540	November	Jan., '37	Amer. Car & Fdy.
	30	Tank	100,000	36	4	Steel	.....	March	May	Amer. Car & Fdy.
Phillips Petroleum Co.	2	Tank	100,000	.....		Steel	69,000	June	October	General American
	15	Tank	100,000	.....		Steel	69,000	September	.....	General American
	1	Tank	100,000	.....		Steel	69,000	September	.....	General American
	8	Tank	100,000	.....		Steel	69,000	October	.....	Amer. Car & Fdy.
	10	Tank	.....	.....		.....	.....	February	1936	General American
Pittsburgh Plate Glass	10	Tank	30,000	32	7	Steel	48,500	August	December	Amer. Car & Fdy.
	5	Tank	60,000	33	10	Steel	64,160	November	Jan., '37	Amer. Car & Fdy.
	5	Tank	30,000	42	4	Steel	.....	November	December	Amer. Car & Fdy.
Pullman Railroad	1	D. S. Box	100,000	40	6	Steel	35,200	April	June	Pullman-Standard

Fifty-Ton Steel-Sheathed Auto-Furniture Car—Weight, 50,200 Lb.; Loaded Weight, 118,800 Lb.; Capacity, 3,847 Cu. Ft.; Length Inside, 40 Ft. 6 In.—Built by the Magor Car Corporation

Purchaser	No.	Class	Capacity	Length, ft.	Length, in.	Construction	Weight	Date of order	Date of delivery	Builder
The Reading Co.	200	D. S. Auto.	100,000	40	7	Steel	53,000	September	1937	Company Shops
	200	Gondola	140,000	65	6	Steel	63,500	September	1937	Company Shops
	25	Caboose	.....	.....		Steel	.....	December	1937	Company Shops
St. Louis-San Francisco	5	S. S. Box	100,000	40	6	Steel Frame	45,500	1936	Aug., '37	Company Shops
	2	S. S. Auto	100,000	40	6	Steel Frame	49,600	1936	Sept., '37	Company Shops
	2	Hopper	100,000	30	6	Steel	41,200	1936	Sept., '37	Company Shops
	1	Gondola	100,000	41	6	Steel Frame	45,100	1936	Nov., '37	Company Shops
	21	Caboose	80,000	29	0	Steel Frame	43,500	1936	Jan.-Nov., '37	Company Shops
St. Louis Southwestern	50	S. S. Auto	100,000	50	6	Steel	57,500	July	November	General American
Seaboard Air Line	25	D. S. Box	100,000	40	6	Steel	56,300	January	June-July	Company Shops
	100	Phosphate	140,000	34	10	Steel	50,700	May	July-Aug.	Pullman-Standard
	1000	Box	.....	.....		.....	.....	December	1937	Pullman-Standard
Shawnigan Products Corp.	2	Alum. Tank	80,000	36	8	Steel Frame	34,200	September	October	General American
Shell Chem. Co. of Cal.	4	Tank	8,000g	36	4	Steel	42,500	September	October	Amer. Car & Fdy.
	15	Tank	8,000g	.....		.....	.....	February	1936	General American
Shippers' Car Line	1	Tank	60,000	33	10	Steel	61,280	March	June	Amer. Car & Fdy.
	1	Tank	8,000g	36	4	Steel	51,500	January	March	Amer. Car & Fdy.
	4	Tank	8,000g	36	4	.....	49,890	Dec., '35	.....	Amer. Car & Fdy.
	5	Tank	8,000g	36	4	.....	44,260	Dec., '35	.....	Amer. Car & Fdy.
Solvay Process Co.	10	Tank	30,000	42	4	Steel	53,400	January	February	Amer. Car & Fdy.
Southern Pacific	500	D. S. Box	100,000	40	6	St. Underframe	44,400	June	December	Pullman-Standard
	250	D. S. Box	100,000	40	6	St. Underframe	44,400	June	November	Amer. Car & Fdy.
	500	D. S. Box	100,000	40	6	St. Underframe	44,400	June	December	Pressed Steel
	500	D. S. Box	100,000	40	6	St. Underframe	44,400	June	Jan., '37	Bethlehem
	500	D. S. Auto	100,000	50	6	St. Underframe	60,000	June	November	General American
	250	D. S. Auto	100,000	40	6	St. Underframe	53,900	June	November	Mount Vernon
	200	Flat	100,000	52	0	St. Underframe	42,500	June	Jan., '37	Company Shops
	100	Gondola	100,000	50	0	St. Underframe	52,000	June	Feb., '37	Company Shops
	250	Box	100,000	40	6	Steel	45,700	November	.....	Amer. Car & Fdy.
	250	S. S. Box	100,000	40	6	Steel	44,700	December	Feb., '37	Bethlehem
	825	Auto	100,000	50	6	Steel	60,000	December	May, '37	General American
	250	Box	.....	.....		.....	.....	December	1937	Pullman-Standard
	250	Box	.....	.....		.....	.....	December	1937	Pressed Steel
	350	Auto	.....	.....		.....	.....	December	1937	Mount Vernon
Sylvania Ind. Corp.	1	Tank	6,000g	31	10	Steel	42,340	August	October	Amer. Car & Fdy.
Tank Car Corp. of Amer.	10	Tank	8,000gq	36	4	Steel	46,430	November	Jan., '37	Amer. Car & Fdy.
Union Carbide	1	Cov. Hopper	100,000	22	8	Steel	42,400	March	June	Greenville
Union Pacific	1000	D. S. Box	100,000	40	6	Steel	45,000	May	Feb., '37	Company Shops
Union Railroad Company	400	Gondola	140,000	50	6	Steel	53,500	April	July	Pressed Steel
	200	Gondola	140,000	50	6	Steel	53,500	April	September	Pullman-Standard
	100	Gondola	140,000	50	6	Steel	53,500	April	July	Ralston
	100	Gondola	140,000	50	6	Steel	53,500	April	July	Magor
	200	Gondola	140,000	50	6	Steel	53,500	April	June	Greenville
	100	Gondola	140,000	50	6	Steel	53,300	September	Feb., '37	Ralston
	600	Gondola	.....	.....		.....	.....	December	1937	Pressed Steel
	200	Gondola	.....	.....		.....	.....	December	1937	Magor
	100	Gondola	.....	.....		.....	.....	December	1937	Ralston
Union Tank Car Company	25	Tank	100,000	.....		.....	.....	1936	November	Company Shops
	20	Tank	100,000	.....		.....	.....	1936	September	Company Shops
	370	Tank	80,000	33	10	Steel	.....	May	August	Amer. Car & Fdy.
	3000	Tank	80,000	32	2	Steel	43,650	June	.....	Amer. Car & Fdy.
	5	Hopper	80,000	45	10	Steel	50,700	November	Jan., '37	Amer. Car & Fdy.
United Carbon Co., Inc.	30	Air Dump	30 cu. yd.	33	4	Steel	76,200	October	October	Western Wheel
Utah Copper Co.	250	Gondola	200,000	24	5	Steel	46,500	October	Jan.-Mar., '37	Pressed Steel
Virginian	25	D. S. Auto	100,000	50	6	Steel	57,000	November	Jan., '37	Greenville
Western Fruit Express	50	Refrigerator	75,000	33	3	Steel	55,400	March	Jul.-Nov.	Company Shops
Western Maryland	500	D. S. Box	100,000	40	6	Steel	48,900	November	Feb., '37	Bethlehem
	100	D. S. Auto	100,000	40	6	Steel	50,000	November	Feb., '37	Bethlehem
	100	Gondola	100,000	52	6	Steel	52,000	November	Feb., '37	Bethlehem
	25	Caboose	.....	.....		.....	.....	July	1936	Company Shops
	10	Box	100,000	40	6	Steel	53,500	April	September	Greenville
Western Pacific	100	Ballast	100,000	30	3	Steel	42,700	February	May	Rodger-A. C. & F.
	100	Ballast	100,000	30	3	Steel	42,700	November	.....	Rodger-A. C. & F.
	50	Flat	100,000	50	0	Steel Frame	.....	November	.....	Pac. Car & Fdy.
	200	Box	.....	.....		.....	.....	December	1937	Mount Vernon
Wheeling & Lake Erie	500	Hopper	140,000	35	0	Steel	40,300	June	October	Pullman-Standard
	500	Hopper	140,000	35	0	Steel	40,300	June	November	Ralston
Wilson Car Lines	4	Refrigerator	.....	.....		.....	.....	1936	1936	Company Shops
Wisconsin Central	100	D. S. Box	100,000	40	6	Steel	45,400	June	October	Pullman-Standard
	100	D. S. Box	100,000	40	6	Steel	45,800	June	October	Pullman-Standard
	50	D. S. Box	100,000	50	0	Steel	50,500	June	November	Pullman-Standard
Youngstown & Northern	100	Gondola	140,000	40	0	Steel	51,200	August	September	Greenville

Export

Purchaser	No.	Class	Capacity	Length, ft.	Length, in.	Construction	Weight	Date of order	Date of delivery	Builder
The Guayaquil & Quito	50	Box	50,000	.....		.....	.....	July	.....	Amer. Car & Fdy
Lone Star Cement Co.	10	Bucket Car	60,000	33	0	Steel	41,098	October	Jan., '37	Pullman-Standard
Newfoundland Ry.	50	S. S. Box	60,000	35	0	Steel Frame	35,800	August	October	Koppel
Paulista Ry. of Brazil	400	Box	90,000	.....		Steel	.....	January	1936	Pullman-Standard
Standard Oil Co. of N. J.	6	Tank	10,000g	.....		.....	.....	June	1936	Pullman-Standard
	5	Tank	12,000g	.....		.....	.....	July	1936	General American
	5	Tank	8,000g	.....		.....	.....	July	1936	General American

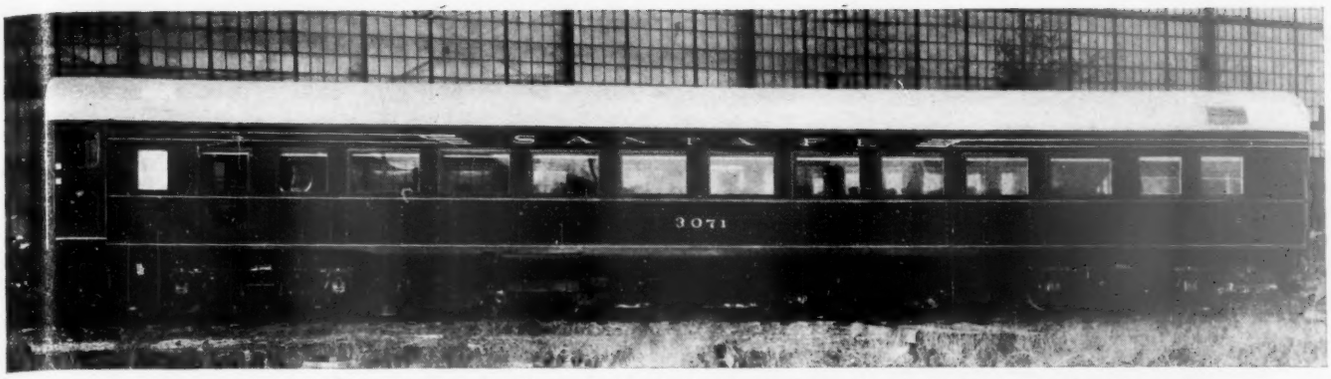
Canada

Purchaser	No.	Class	Capacity	Length, ft.	Length, in.	Construction	Weight	Date of order	Date of delivery	Builder
Dominion Steel & Coal Co.	15	Flat	100,000	40	6	Steel Frame	35,000	September	December	Eastern Car
	25	Coal	100,000	30	1	Steel Frame	42,700	September	December	Eastern Car
	25	Coke	100,000	30	1	Steel Frame	45,000	September	December	Eastern Car
Thurso & Nation Valley	6	.....	.....	.....		.....	.....	1936	1936	Company Shops
Sydney & Louisberg	200	Coal	100,000	30	1	Steel Frame	42,700	September	Jan., '37	Eastern Car

More Increases in Railway Material Costs in 1936

(*Continued from page 69*)

most uniformly during the past twelve months until it is now 10 per cent above the price a year ago. Sheet copper prices are relatively unchanged, but journal bearings are up 12 per cent above 1935 and 32 per cent above 1933. Costs of rubber air hose and leather belting were uniformly the same last year as in 1935 for most roads. Waste for journal packing averages 20 per cent higher and creosote oil 7 per cent higher than in 1935. Cement costs, at from $1.85 to $2.10 per bbl. to different roads, were unchanged to most roads from the 1935 prices, but reductions up to 10 per cent were obtained by some roads. The average prices paid for these and other materials in 1936 and the comparison of those averages with the corresponding averages in previous years are shown in the table on page 64.



A Modern Light-Weight Coach with Lounge Rooms Built by the St. Louis Car Company for the Atchison, Topeka & Santa Fe

Passenger-Train Cars Ordered in 1936

Domestic total of 307, including body units for partially articulated trains, compares with 91 in previous year

By Frank W. Kraeger

Associate Editor

PASSENGER-TRAIN cars ordered during 1936 for domestic service in the United States totaled 307 or more than three times the comparable 1935 figure of 91. This latter has been revised upward from the 63 reported in this article in last year's Annual Statistical Number in order to include body units for articulated or partially articulated motor trains, thereby consolidating the reporting of orders for equipment for passenger-train service into one article.

In former years such orders have been reported under the two classifications of "Passenger-Train Cars" and "Rail-Motor Cars or Motor Trains." The first of the

Table I—Passenger-Train Car Orders of 1936

For service in the United States	307*
For service in Canada	10
For export to other countries	..
Grand total	317*

* Includes 102 body units of articulated or partially-articulated trains.

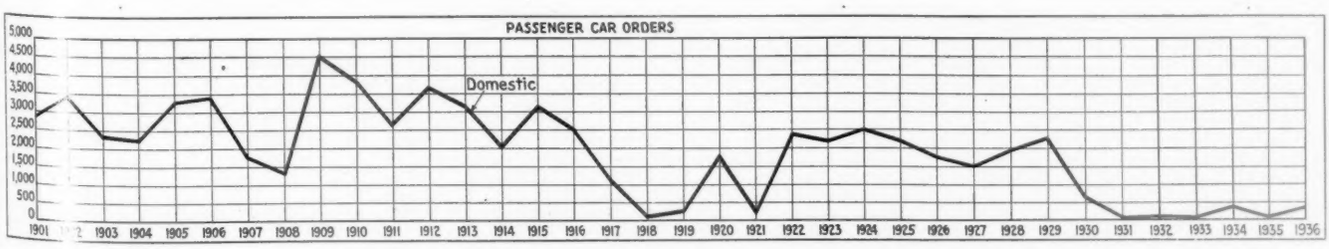
Table II—Orders for Passenger-Train Cars Since 1901

Year	Domestic Orders Only: Passenger cars	Year	Passenger cars
1901	2,879	1909	4,514
1902	3,459	1910	3,881
1903	2,310	1911	2,623
1904	2,213	1912	3,642
1905	3,289	1913	3,124
1906	3,402	1914	1,674
1907	1,791	1915	1,978
1908	1,319		

Year	Domestic and Foreign: Domestic	Canadian	Export	Total
1916	2,302	...	109	2,411
1917	1,124	...	43	1,167
1918	9	22	26	57
1919	292	347	143	782
1920	1,781	275	38	2,094
1921	246	91	155	492
1922	2,382	87	19	2,488
1923	2,214	263	6	2,483
1924	2,554	100	25	2,679
1925	2,191	50	76	2,317
1926	1,868	236	58	2,162
1927	1,612	143	48	1,803
1928	1,930	334	29	2,293
1929	2,303	122	33	2,458
1930	667	203	15	885
1931	11	11	21	43
1932	39	...	...	39
1933	6	...	...	6
1934	388	...	15	403
1935	91*	16	...	107*
1936	307†	10	...	317†

* Revised to include 28 body units of articulated or partially-articulated trains.

† Includes 102 body units of articulated or partially-articulated trains.



Passenger Car Orders from 1901 to 1936

The Bar in the Chicago & North Western Buffet-Lounge Car "Flambeau"

light-weight, streamlined trains were made up of three articulated units, the first of which housed the power plant, and in addition contained considerable revenue space. They were, therefore, logically classed with rail-motor cars. The later trains of this general type, however, have become too long for motor-car haulage and are provided with Diesel-electric locomotives. This year, therefore, orders for revenue body units of these trains are classed with other passenger-train cars and the power units ordered are reported in the article on locomotive orders. Orders for rail-motor cars continue to be placed but in small numbers. These are discussed later and shown in a separate table in this article. In order to facilitate comparisons with last year, the 1935 domestic total in the accompanying Table II has been recalculated on the new basis—the increase amounts to 28 cars as noted at the outset.

Table III—Passenger-Train Cars Built in 1936

	United States	Canada	Total
Domestic	142	10	152
Foreign	...	...	...
	142	10	152

Comparison with Previous Years

Year	Domestic	Foreign	Total
1899	1,201	104	1,305
1900	1,515	121	1,636
1901	1,949	106	2,055
1902	From 1902 to 1907		1,948
1903	passenger car figures		2,007
1904	in these two columns		2,144
1905*	included in corre-		2,551
1906*	sponding freight car		3,167
1907*	columns.		5,457
1908*	1,645	71	1,716
1909*	2,698	151	2,849
1910*	4,136	276	4,412
1911*	3,938	308	4,246
1912†	2,822	238	3,060

* Includes Canadian output.
† Includes Canadian output and equipment built in company shops.

	United States			Canadian			
Year	Domestic	Foreign	Total	Domestic	Foreign	Total	Grand total
1913	2,559	220	2,779	517	...	517	3,296
1914	3,310	56	3,366	325	...	325	3,691
1915	1,852	14	1,866	83	...	83	1,949
1916	1,732	70	1,802	37	...	37	1,839
1917	1,924	31	1,955	45	...	45	2,000
1918	1,480	92	1,572	1	...	1	1,573
1919	306	85	391	160	...	160	551
1920	1,272	168	1,440	...	...	...	1,440
1921	1,275	39	1,314	361	...	361	1,675
1922	676	144	820	71	...	71	891
1923	1,507	29	1,536	...	...	...	1,536
1924	2,150	63	2,213	167	...	167	2,380
1925	2,363	50	2,413	...	...	...	2,411
1926	2,184	102	2,286	285	...	285	2,571
1927	1,785	50	1,835	126	...	126	1,963
1928	1,356	15	1,371	237	...	237	1,608
1929	1,254	20	1,274	162	...	162	1,436
1930	1,264	40	1,304	210	...	210	1,514
1931	198	21	219	66	...	66	285
1932	39	...	39	...	...	...	39
1933	6	...	6	...	...	...	6
1934	268	15	283	...	...	...	283
1935	197	...	197	...	...	...	197
1936	142	...	142	10	...	10	152

With the exception of 1934 when 388 were ordered the 307 passenger-train cars ordered this year constitutes the largest total since 1930 when 667 were ordered. Of last year's total 102, or approximately one-third, were body units for articulated or partially-articulated trains as compared with the 28 body units for such trains ordered in 1935.

Meanwhile air-conditioning programs have proceeded until the railroads and the Pullman Company at the close of last year had an estimated total of about 8,500 cars so equipped. At the close of 1935 approximately 5,800 air-conditioned cars were in service.

For the second successive year no passenger-train cars were ordered in the United States for export. The 1934 orders for 15 cars have constituted the only business in this connection since 1931.

In Canada 10 passenger-train cars were ordered during 1936 as compared with 16 in 1935. These 26 constitute the only orders for passenger-train cars which Canadian builders have received since 1931 when 11 were ordered. There was a complete cessation of activity in passenger-train car markets there during the three-year period, 1932 to 1934, inclusive.

Orders for Rail-Motor Cars

Passenger-train cars built during 1936 for domestic service in the United States totaled 142 as compared with 197 in 1935 and 268 in 1934. Like export orders, production here for export has been at a standstill for the past two years. In Canada 10 passenger-train cars were built last year.

Reporting 1936 orders for rail-motor cars on the basis

outlined in the foregoing, and recalculating 1935 figures on the same basis, there were ordered here last year seven rail motor-cars for domestic service as compared with 10 in the previous year. Also, export orders were placed here last year for six rail-motor cars as compared with a 1935 export order for four.

The accompanying lists of orders, amplifying the summary tables also published herewith, have been compiled in the usual way. Returns from railroads were checked against lists of orders supplied by the car builders, largely through the courtesy of the American Railway Car Institute.

Passenger-Train Car Orders in 1936

For Service in the United States

Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Atchison, Topeka & Santa Fe	1	Baggage	..	.	..	.....	April	.....	Budd
	1	Dining	..	.	..	.....	April	.....	Budd
	1	Club	..	.	..	.....	April	.....	Budd
	4	Sleeping	..	.	..	.....	April	.....	Budd
	1	Sl. Obs.	..	.	..	.....	April	.....	Budd
Baltimore & Ohio	1 AC	Coach	70	6	64	100,000	March	December	Company Shops
Chicago, Burlington & Quincy	2 †	Mail & Bag.	76	3	34	108,280	Dec. '35	December	Budd
	4 AC†	Bag. & Lnge.	84	6	24	95,580	Dec. '35	October	Budd
	2 AC†	Coach	76	3	64	76,500	Dec. '35	October	Budd
	2 AC†	Coach	64	0	38	64,000	Dec. '35	October	Budd
	4 AC†	Coach	64	0	60	58,700	Dec. '35	December	Budd
	2 AC†	Diner	73	6	40	91,060	Dec. '35	October	Budd
	2 AC†	Diner	64	0	32	65,670	Dec. '35	December	Budd
	2 AC†	Lnge.-Buffet	78	8	32	84,300	Dec. '35	October	Budd
	2 AC†	Parlor	64	0	21	57,100	Dec. '35	December	Budd
	2 AC†	Parlor-Lnge.	78	8	30	60,830	Dec. '35	December	Budd
	6 AC†	Sleepers	76	3	..	81,600	Dec. '35	October	Budd
	2 AC†	Sleepers	76	3	..	87,050	Dec. '35	October	Budd
Chicago, Milwaukee, St. P. & Pac.	2	Parlor	81	8⅞	48	92,000	April	October	Company Shops
	2	Parlor	81	7⅞	36	95,100	April	September	Company Shops
	2	Parlor	81	8⅞	38	95,300	April	October	Company Shops
	2	Diners	81	11½	48	102,500	April	September	Company Shops
	2	Tap R. & E.	81	11½	40	96,200	April	September	Company Shops
	17	Coach	81	8⅞	66	95,200	April	Sept.-Oct.	Company Shops
	5	Mail & Exp.	75	3½	..	94,200	April	November	Company Shops
	5	Express	75	3½	..	88,000	April	October	Company Shops
Chicago, Rock Island & Pacific	6 †	Bag.-D.-C.	76	5	32	79,980	November	June '37	Budd
	2 †	Coach	64	0	60	61,500	November	June '37	Budd
	6 †	Coach	76	5	76	85,650	November	June '37	Budd
	6 †	Co. Obs. Par.	78	6	68	82,900	November	June '37	Budd
Denver & Rio Grande Western	5	Din.-Coach	78	5	48	141,000	January	June	Company Shops
	3	Din.-Lng.	79	6	38	166,700	January	June	Company Shops
Gulf, Mobile & Northern	2 AC	Coach	77	4	80	90,000	November	Apr. '37	Amer. Car & Fdy.
Kansas City Southern	4 AC	Chair	83	5	76	108,000	November	Mar. '37	Pullman-Standard
	1 AC	Diner-Ch.	80	0	56	.....	November	Apr. '37	Pullman-Standard
Long Island	1 MU	Coach	70	0	136	97,000	October	1937	Penn. Shops
	1 MU	Coach	70	0	136	72,000	October	1937	Penn. Shops
New York, New Haven & Hartford	20 AC	Coach	82	4½	84	100,000	April	Sept.-Dec.	Pullman-Standard
	30 AC	Coach	82	4½	92	100,000	April	Sept.-Dec.	Pullman-Standard
Pullman	1	Sleeper	..	.	..	.....	1936	.....	Pullman-Standard
Richmond, Fredericksburg & Pot.	1	Business	82	6	..	173,000	October	October	Amer. Car & Fdy.
	6	Bag. & Exp.	71	6	..	.....	December	1937	Amer. Car & Fdy.
St. Louis-San Francisco	2 AC	Lounge	79	0	34	189,000	.....	April	Company Shops
Seaboard Air Line	6 AC	Coach	82	4¼	76	.....	July	December	Pullman-Standard
	4 AC	Pass. & Bag.	82	4¼	52	.....	July	Jan. '37	Pullman-Standard

Main Compartment of an Atchison, Topeka & Santa Fe Air-Conditioned Coach Built by the St. Louis Car Company

Purchaser	No.	Class	Length Ft.	Length In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Southern Pacific	20	Bag.-Horse	83	6	..	162,000	June	Jan. '37	St. Louis Car
	2 AC	Coach-Bag.	79	2	44	105,862	June	Mar. '37	Pullman-Standard
	2 AC	Coach	79	2	48	103,431	June	Mar. '37	Pullman-Standard
	12 AC†	Coach	66	1	50	89,830	June	Mar. '37	Pullman-Standard
	2 AC	Tavern	79	2	..	117,523	June	Mar. '37	Pullman-Standard
	2 AC	Dining	79	2	..	120,170	June	Mar. '37	Pullman-Standard
	2 AC	Parlor	79	2	29	102,461	June	Mar. '37	Pullman-Standard
	2 AC	Parlor-Obs.	78	1½	23	99,079	June	Mar. '37	Pullman-Standard
Union Pacific	28 AC	Coaches	81	0	..	111,729	November	1937	Pullman-Standard
	12 AC	Coaches	81	0	..	111,701	November	1937	Pullman-Standard
	5 AC†	Diners	70	0	..	104,748	November	1937	Pullman-Standard
	5 AC†	Kitchen	70	0	..	98,311	November	1937	Pullman-Standard
Union Pac.-So. Pac.-C. & N. W.	14 AC†	Co. Din. Sl.	..	.	..	.....	December	.....	Pullman-Standard
Union Pac.-C. & N. W.	14 AC†	Co. Din. Sl.	..	.	..	.....	December	.....	Pullman-Standard

Canada

Purchaser	No.	Class	Length Ft. In.	Seating Capacity	Weight	Date of Order	Date of Delivery	Builder
Temiskaming & Nor. Ont.	6 AC	Coach	79 10½	64	132,000	June	December	National Steel
	4	Coach & Bag.	79 10½	38	.....	June	December	National Steel

AC indicates cars are air conditioned.
† Body units of articulated or partially articulated trains.

Rail-Motor Cars

For Service in the United States

Road	No.	Type of Power Plant	Horse-Power	Seating Capacity	Length of Bagg. Compt. Ft.	Length of Bagg. Compt. In.	Weight	Builder
Alabama, Tennessee & Northern	2	Gas-Elec.	275	34	22	0	116,000	St. Louis Car
Chicago & Eastern Illinois	2	Gasoline	200	61	16	0	57,000	Amer. Car & Fdy.
De Queen & Eastern	1	Gasoline	..	20	..	.	9,300	International
Gulf, Mobile & Northern	1AC	Diesel-Elec.	600	..	30	2	166,300	Amer. Loco.—A. C. & F.
Midland Terminal	1	Diesel	236	14	26	0	30,000	Buda-Co. Shops

Export

Road	No.	Type of Power Plant	Horse-Power	Seating Capacity	Length of Bagg. Compt. Ft.	Length of Bagg. Compt. In.	Weight	Builder
Chilean State Rys.	3	.....	..	34	..	.	.....	Edwards
State Rys. of Uruguay	3	.....	..	..	..	.	.....	Amer. Car & Fdy.

Locomotives Ordered in 1936

(*Continued from page 71*)

with four in 1935 and none in the two previous years—1934 and 1933.

The distinction between locomotives ordered and the number built should be emphasized. A locomotive is under construction for several months and thus locomotive production figures for any year naturally include some units which were ordered during the closing months of the year previous to that under review. It is this overlap from year to year that results in a total production figure different from the total ordered. Also, while the factor has been unimportant in recent years, it should nevertheless again be pointed out, to those comparing the more recent with the more remote years listed in the accompanying tabulation, that modern locomotives are far more powerful and far more costly than those of the days when yearly orders totaled thousands.

The Car Service Division of the Association of American Railroads reports monthly totals of locomotive installations and retirements. These figures will not agree with the *Railway Age* totals of locomotives ordered or built, because the Car Service Division total covers only Class I carriers, whereas the *Railway Age* figures cover all carriers, and also industrial users.

The details in the appended list of locomotive orders were supplied by railways and other purchasers in response to inquiries from the *Railway Age*. They were checked against similar lists furnished through the co-operation of the builders, and amplified by reference to the weekly reports in the Equipment and Supplies column of the *Railway Age*. The *Railway Age* does not desire to make any claims as to the scientifically statistical accuracy of the tables, or totals drawn from them. However, the real purpose of the statistics is to allow comparisons of the year's business with that of other years, which purpose it is hoped they meet with entire adequacy.

Table III—Locomotives Built in 1936

	United States	Canada	Total
Domestic	157	23	180
Foreign	22	..	22
Total	179	23	202

Comparison with Previous Years

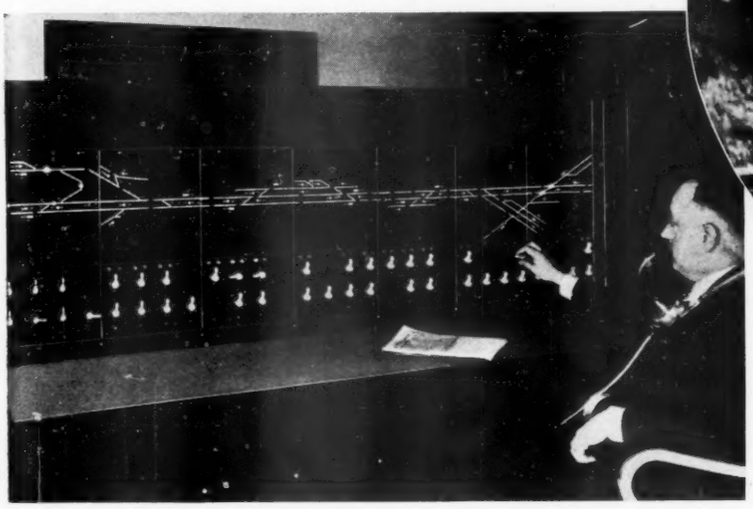
Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896	866	309	1,175	1913†	4,561	771	5,332
1897	865	386	1,251	1914†	1,962	273	2,235
1898	1,321	554	1,875	1915†	1,250	835	2,085
1899	1,961	514	2,475	1916‡	2,708	1,367	4,075
1900	2,648	505	3,153	1917†	2,585	2,861	5,446
1901	....	....	3,384	1918†	3,668	2,807	6,475
1902	....	....	4,070	1919†	2,162	1,110	3,272
1903	....	....	5,152	1920†	2,022	1,650	3,672
1904	....	....	3,441	1921†	1,185	638	1,823
1905*	4,896	595	5,491	1922†	1,303	231	1,534
1906*	6,232	720	6,952	1923†	3,505	280	3,785
1907*	6,564	798	7,362	1924†	1,810	226	2,036
1908*	1,886	456	2,342	1925†	994	291	1,285
1909*	2,596	291	2,887	1926†	1,585	185	1,770
1910*	4,441	314	4,755	1927†	1,009	167	1,176
1911*	3,143	387	3,530	1928†	636	111	747
1912†	4,403	512	4,915				

* Includes Canadian output.
† Includes Canadian output and equipment built in railroad shops.

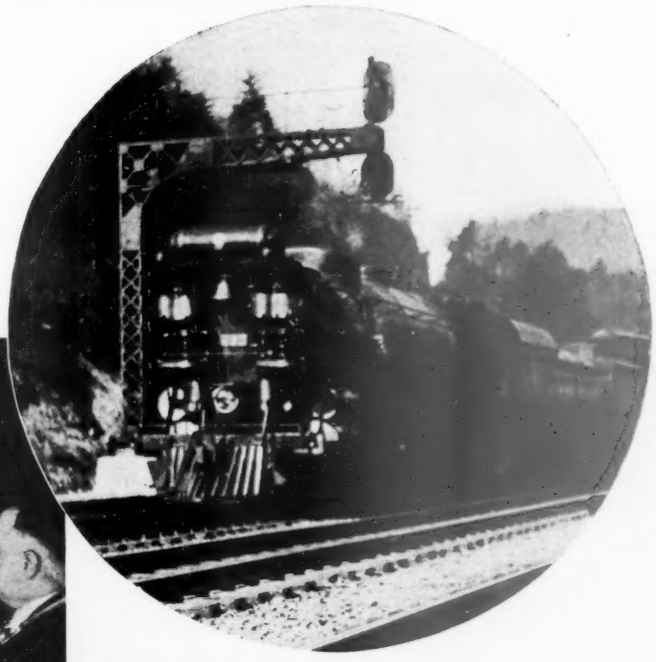
	United States			Canada			Grand total
	Domestic	Foreign	Total	Domestic	Foreign	Total	
1929	926	139	1,065	96	..	96	1,161
1930	972	51	1,023	111	..	111	1,134
1931	181	17	198	24	..	24	222
1932	102	18	120	2	1	3	123
1933	57	6	63	..	..	..	63
1934	91	19	110	..	..	..	110
1935	184	17	201	4	..	4	205
1936	157	22	179	23	..	23	202

Signal Construction Increased During 1936

Forty-three per cent more facilities installed than in 1935—Prospects are excellent for coming year



New Unit Panel-Type C. T. C. Machine Installed at Albany, N. Y., on the Delaware & Hudson



The C. & O. Extended Centralized Traffic Control Near White Sulphur Springs, W. Va.

By John H. Dunn
Signaling Editor

DURING 1936, the construction of signaling in the United States and Canada increased 43.3 per cent, as compared with 1935, the number of units of equipment placed in service totaling 4,489, as compared with 3,121 during the previous year. This figure of 4,489 units for 1936 is larger than in any of the last five years, but is still far short of normal, as represented by 16,223 units in 1929 and 17,499 in 1930. In brief, the major items of equipment placed in service during 1936 included the following units: Automatic signals, 838; highway-railroad protection, 2,234; interlocking levers, 653; signals at remote and centralized control, as well as at automatic plants, 322; and spring switches, 216.

New Construction Augmented by Modernization

In 1936, for the first time in several years, new automatic block signaling rose to the sizable figure of 495 miles, several of the projects being on through routes where train schedules are being speeded up, thus serving the dual purpose of improving safety and reducing train delays. Another important item of new construction was the installation of automatically-controlled highway-railroad grade crossing protection, which reached a new high in 1936, a total of 1,071 crossings being protected with 2,234 units of equipment in the form of signals, automatic gates, or barriers.

Figures showing the mileage of new block signals, however, do not present a complete analysis of the equipment placed in service, because the replacement of obsolete apparatus, to effect more efficient train operation and to reduce the cost of operating the signaling, now forms a major part of the total volume of construction. Semaphore automatic block signals are being replaced with light signals at the same time that the locations are respaced and additional aspects provided to arrange for safe and efficient operation of trains at higher speeds; some roads, such as the Pennsylvania, are also adding cab signaling.

In some instances the introduction of a few high-speed trains has caused such serious delays to other trains as to bring about the installation of power machines for the operation of outlying junction and passing track switches which are controlled remotely or as part of a centralized control system. In the field of interlocking, mechanical plants are being replaced by power apparatus so that two or more layouts can be controlled from a central point. Such consolidations of interlockings include the direction of train movements by signal indication throughout an extended area. For example, an installation recently completed by the Delaware & Hudson on seven miles of double-track line between Watervliet, N. Y., and Albany, includes the control of switches and crossovers at four layouts where interlockings were replaced, the entire territory now being controlled from one C.T.C. machine.

Automatic Signaling in 1936

Whereas only a limited mileage of new automatic signaling had been constructed during 1931 to 1935 inclu-

Automatic Block Signals Completed During 1936

Road	Location	Miles of Road	No. of Signals	Manufacturer	Power Supply
B. & O.	Belpre, Ohio, to Stewart	22.4s	43cp	G.R.S.	ACF
	W. Jct., Ohio, to Chillicothe	14.5s	36cp	G.R.S.	ACF
	Grosvenor, Ohio, to New Marshfield	6.0s	17cp	G.R.S.	ACF
B. & M.	Manchester, N. H.	...	1c	Union	Prim.
	Rockingham, N. H., to Durham*	4.2s	1s	.....	Prim.
		...	1c	.....	ACF*
	Wakefield, Mass., to Reading Highlands	2.8d	1s	G.R.S.	Prim.
		...	3c	.....	ACF*
	Claremont Jct., N. H.	0.1s	1c	G.R.S.	ACF*
	Concord, N. H.	0.6d	1s	.....	ACF*
			3c	.....	ACF*
C. N.	Wyoming, Ont.	...	1c	G.R.S.	ACF
	Pacific Jct., N. B.	...	1c	Union	Prim.
C. P.	Berthier Jct., Que., to Louiseville	17.8s	27c	Union	ACF
C. & O.	Limeville, Ky., to Vauces, Ohio	46.0d	49c	Union	ACF-line ACP-trk.
	Upper Sandusky, Ohio, to Cummings	49.0d	62c	Union	ACF-line ACP-trk.
C. & N. W.	Waukegan, Ill.-Wisconsin State Line†	9.0d	12c	G.R.S.	ACP
C. M. St. P. & P.	Haugan, Idaho, to Avery	38.0s	50c	Union	AC
D. & R. G. W.	Florence, Colo., to Canon City	6.7d	10c	G.R.S.	ACF
	Midvale, Utah, to Salt Lake City	8.7d	34c	G.R.S.	ACF
	Provo, Utah	2.0d	7c	G.R.S.	ACF
I. C.	Waterloo, Iowa, to Cedar Falls	4.2s	5c	Union	ACP
I. T.	Granite City, Ill.	3.2s	6c	Union	AC
M. P.	Pleasant Hill, Mo., to Rich Hill	54.0s	100c	G.R.S.	ACF
N. Y. C.	Melrose, N. Y., to Botanical Garden	3.0f	24c	G.R.S.	AC
	E. Syracuse, N. Y., to Syracuse Jct.	7.3d	34c	G.R.S.	AC
B. & A.	Worcester, Mass., to Charlton	13.0d	15c#	G.R.S.	ACF
St. L.-S. F.	Memphis, Tenn., to Amory, Miss.	120.9s	192s	Union	Prim.
S. P. T. & N. O.	Ft. Worth Yards, Tex.	0.6s	3s	Union	ACF*
U. P.	Waterloo, Neb., to Ames**	20.5d	34c	Union	ACF*
	Richland, Neb., to Columbus**	7.0d	11c	Union	ACF*
	Rawlins, Wyo., to Riner**	17.5d	29c	Union	ACF*
	Pendleton, Ore.	1.0s	5s	Union	ACF
Wabash	Tilton, Ill., to Catlin	2.0s	1s	Union	Prim.
		...	2c	Union	Prim.
	Ferguson, Mo., to St. Charles	12.7s	16c	Union	ACF*
		301.6s	204s		
		190.1d	538c		
		3.0f	96cp		
		494.7	838		

Legend:
In "Miles of Road" column: s = Single track. d = Double track. f = Four tracks.
In "Number of Signals" column: s = Semaphore. c = Colorlight. cp = Color-position light.
In "Power Supply" column: AC = Alternating current. ACF = A-C. floating. ACF* = A-C. floating with primary battery for track circuits. ACP = A-C. primary. Prim. = Primary.
* Rearrangement of signals on one track of double track in existing automatic territory.
† Double track disc signals were replaced with colorlight signals.
# Signals installed to replace semaphore signals on one or more tracks of multiple track line.
** Single arm semaphore signals changed to colorlight signals.

sive, 1936 saw an increase in new installations, principally on important through routes where both passenger and freight train speeds are being increased. For example, the St. Louis-San Francisco installed new automatic blocks on 121 miles of single track on its line between Memphis, Tenn., and Birmingham, Ala.; the Chesapeake & Ohio equipped 95 miles of line with automatics; the Missouri Pacific, 54 miles; and the Baltimore & Ohio, 43 miles. These installations, together with projects on 13 other roads, totaled 495 miles of new automatic block, as compared with 310 miles completed the previous year.

In addition to this new signaling, numerous roads rehabilitated obsolete installations, respacing the locations, replacing semaphore with light signals, and, in some instances, providing additional aspects to assure adequate braking distance for higher speed trains, as well as to secure maximum track capacity and reduce delays on heavy traffic lines. The Norfolk & Western replaced lower-quadrant two-position semaphores with position-light signals on 40 miles of double track, and the Union Pacific replaced semaphores with color-light signals on 45 miles of line, while the Boston & Albany made similar changes on 13 miles of double-track line. The Pennsylvania is providing additional aspects in its New York-Philadelphia territory to assure adequate braking distance for trains operating at 90 m.p.h. The Atchison, Topeka & Santa Fe is installing additional aspects where required on the route of its Super Chief, and the Burlington is planning an extensive program of signaling modernization. During 1936, dragging equipment detectors were first brought to attention as auxiliary protection afforded by automatic block signals—a device located at rail level so arranged that if struck by a low arch bar or brake beam the signal ahead will be set to warn the engineman to stop the train. Several installations were made on the Pennsylvania during 1936, and one installation has been in service on the Lackawanna for several years.

Interlocking Progresses

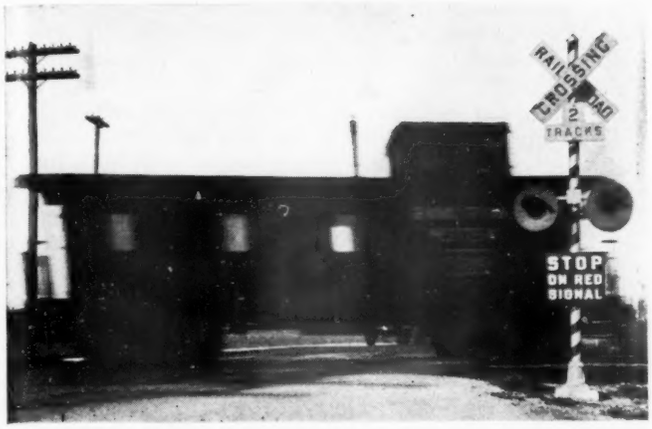
The construction of interlockings during 1936 continued on a comparatively limited basis, 27 new plants being installed as compared with 20 in the previous year, and 18 plants in 1934. The largest plant placed in service during 1936 was on the New York Central at Syracuse, N. Y., this installation being controlled by a modern miniature-lever machine of the desk panel type, somewhat similar to that used for centralized traffic control installations, the locking being effected by electric circuits rather than by mechanical locking. Another new feature of this plant was the extensive use of dwarfs for interlocking home signals, multiple-aspects being used for the through routes to permit trains to be operated at the highest permissible speeds. The Southern Pacific installed a 32-lever electric interlocking at New Orleans, La., at a junction with a new double-track line extending over the new Mississippi River bridge. At Readville, Mass., near Boston, the New Haven simplified the track layouts and consolidated the control of three interlockings, thus effecting an annual saving in operating expenses that will pay for the improvements in three years.

As listed in the table, 6 interlockings were rebuilt, a total of 99 new levers being added. At some of these plants, track changes were made to reduce curvature and to install longer turnouts to permit higher train speeds.

Automatic Interlockings Completed During 1936

Road	Location	No. of Tracks on Reporting Road	No. of Tracks on Other Road	No. of Signals	Manufacturer
B. & M.	Reading, Mass.‡	—	—	3	G.R.S.
C. N.	Ranelagh, Que.	—	—	8	.....
C. & E. I.	Vincennes, Ind.	1	1	4	.....
C. B. & Q.	Council Bluffs, Iowa	2	1	8	.....
C. I. & L.	Carmel, Ind.*	1	1	6	G.R.S.
C. M. St. P. & P.	Sinclair, Mont.†	1	1	4	Union
	Paralta, Iowa	2	1	5	Union
C. R. I. & P.	Hampton, Iowa	1	2	8	.....
	Atwood, Iowa	1	1	4	.....
D. & R. G. W.	Brewster, Colo.	2	1	6	G.R.S.
I. C. Y. & M. V.	Scotland, La.	1	1	8	Union
Me. C.	Mechanics Falls, Me.	1	1	4	.....
N. Y. C. C. C. C. & St. L.	Meeker, Ohio	1	2	10	Union
St. L.-S. F.	Boligee, Ala.	1	1	6	Union
	Ardath, Mo.	1	1	8	Union
	Ft. Scott, Kan.	1	1	4	Union
T. & P.	Texarkana, Tex.	1	2	9	G.R.S.
U. P.	Cushing, Utah	1	1	6	.....
Wabash	Hulls, Ill.**	1	1	6	Union
	Total Plants—19.			117	

Legend:
† Four smashboards installed.
* Semi-automatic interlockings.
** Manual-automatic interlockings.
‡ Junction layout with 2 push-buttons for 3 electric locks.



Indiana Used Federal Funds to Install Highway-Railroad Crossing Protection

the layouts being so changed as to necessitate the replacement of mechanical connections with power switch machines, and in some cases new interlocking machines. The improvements in many instances included the installation of light signals to replace semaphores, the addition of electric locking, etc., so that the finished projects represent practically new interlockings insofar as materials and finished installations are concerned.

Remote and Centralized Control

In the field of remote and centralized control, construction during 1936 included 30 installations, as compared with 17 the previous year. The 1936 installations included 140 levers, 86 power switches and 205 controlled signals, which totals represent an increase in all items mentioned as compared with those completed the previous year. The Texas & Pacific installed centralized control on 14.3 miles of single track between Texarkana, Tex., and Springdale, this territory including 4 power switches and 16 controlled signals. On 6.8 miles of double track between Midvale, Utah, and Roper, the Denver & Rio Grande Western installed centralized control involving 8 switches and 28 controlled signals, train movements being directed by signals in either direction on each of the two tracks. On numerous projects, coded control was used to control outlying interlocking layouts. For example, by use of code equipment, the control of an existing electro-pneumatic interlocking on the Pennsylvania at Swissvale, Pa., was consolidated with the control of an interlocking at East Liberty, 2.8 miles away.

During 1936, 19 automatic interlockings were constructed, involving 117 signals, these projects effecting savings in operating expenses sufficient, in most cases, to liquidate the investment within two or three years. In most instances, as on the Denver & Rio Grande Western at Brewster, Colo., new automatic plants replaced manually-operated interlockings, eliminating levermen.

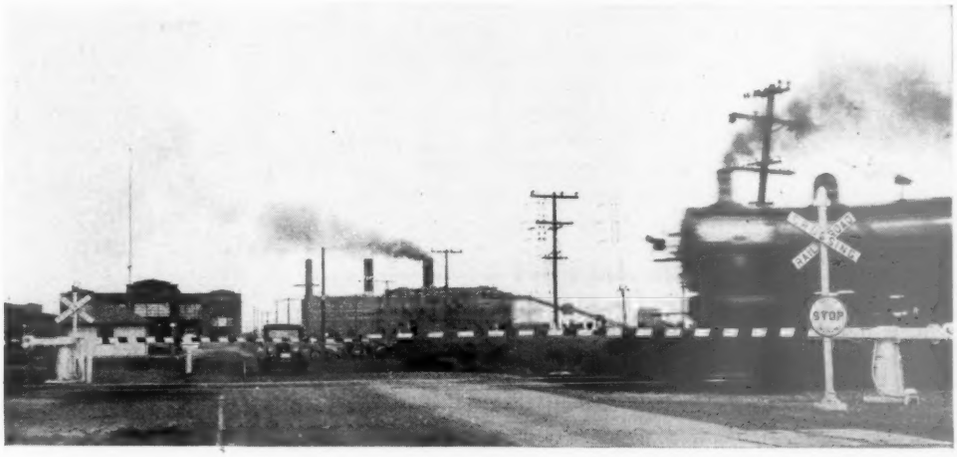
Spring Switches Used Effectively

At other crossings where interlockings were not previously in service, new automatic plants eliminate train stops and facilitate train movements, thereby increasing average train speeds, as well as saving wear and tear on equipment sufficiently to justify the cost of the interlockings. As a result of the experience secured from the plants that are in service, automatic control is gradually being extended to more complicated layouts involving switches, as well as one or more crossings. An automatic plant installed at Hampton, Iowa, involves crossings of three roads, the Rock Island, the Chicago Great Western and the Minneapolis & St. Louis.

The installation of spring switches showed a large increase, a total of 216 such projects being completed in 1936, as compared with 79 in 1935. These spring switches are used where train movements from the turn-

The Norfolk & Western Modernized a Section of Automatics by Replacing Semaphore with Position-Light Signals

out to the main line are preponderantly in one direction. Of the installations made in 1936, 69 were at yard switches, 16 at junctions, 27 at ends of double track, 101 at ends of sidings, 1 at a crossover, and 2 at wye track switches. An important feature of these installations is the fact that mechanical facing-point locks were



The Chicago & North Western Installed Automatically-Controlled Crossing Gates

Interlocking Plants Completed During 1936

Road	Location	Manufacturer	Lever Capacity of Frame	Working Levers: Mechanical	Electric	Electric Pneumatic	Electro-Mech.: Mech.	Elec.
C. N.	Drummondville, Que.	Union	2	..	2	..	..	..
C. P.	Carleton Place, Ont.	G.R.S.	..	..	4*	..	..	..
C. & O.	White Sulphur, W. Va.	Union	..	..	..	..	1	..
	St. Albans, W. Va.	Union	..	..	..	..	11	5
C. M. St. P. & P.	Bridge Switch, Minn.	Union	3	..	3	..	..	..
	Marquette, Iowa	Union	2	..	2	..	..	..
	Milwaukee, Wis.	Union	3	3	..	..	..	..
Erie	Elmira, N. Y.	Union	27	..	17	..	..	..
I. C.	Ponchatoula, La.	Union	4	..	..	..	4	2
L. & N.	Louisville, Ky.¶	G.R.S.	56	..	3	..	..	..
M. P.	Yancopin, Ark.		8	5	..	..	..	..
	Benzal, Ark.		8	5	..	..	..	..
	Mertens, Tex.		2	2	..	..	..	..
N. Y. B. of T.	Continental Ave., N. Y.	Union	83	..	..	69	..	..
	Jamaica Yard, N. Y.	Union	91	..	..	78	..	..
	Union Turnpike, N. Y.	Union	43	..	..	38	..	..
	Parsons Blvd., N. Y.	Union	47	..	..	40	..	..
N. Y. C.	Mott Haven Yd., N. Y.	G.R.S.	32	..	..	..	12	19
	Syracuse Station, N. Y.†	G.R.S.	..	..	98‖	..	..	..
	E. Syracuse, N. Y.	G.R.S.	32	..	..	..	9	13
N. Y. N. H. & H.	Readville, Mass.‡	Union	35	..	17	..	..	..
			60	48	..	..	..	..
Penna.	Newark, N. J.	Union	..	..	..	2	..	..
	Baldwin, Pa.¶		..	..	..	10/	..	..
	Mt. Union, Pa.¶		..	..	..	8/	..	..
	Gunpowder, Md.¶		..	..	..	2/	..	..
	Odenton, Md.¶	Union	..	..	..	8/	..	..
L. I.	Bethpage Jct., N. Y.	Union	19	..	13	..	..	..
Q. C.	Carrier Jct., Que.		2§	2	..	..	..	..
Reading C. of N. J.	Newark, N. J.¶	Union	68	52	16	..	..	..
Southern N. O. T.	New Orleans, La.	G.R.S.	2	..	2	..	..	..
S. P. & T. N. O.	Prosser, Tex.	Union	3	3	..	..	..	..
	Avondale, La.	Union	1	1	..	..	..	..
	West Bridge Jct., La.	G.R.S.	32	..	24	..	..	..
Totals				121	201	255	37	39
Levers	New			69	182	227	37	39
	Added			52	19	28	..	..

	Plants	Levers
New	27	554
Rebuilt	6	99
		653

Legend:
* C. T. C. type control machine.
† Panel type machine—66 C.L. signals, 28 P.O. switches.
‡ All electric machine replaces 3 mechanical machines—Total levers, 264. Working levers, 169.
§ Dual control.
¶ Rebuilt.
‖ Miniature type lever machine, all-relay interlocking.
/ Switches changed from mechanical to electro-pneumatic operation.

provided for 42 of the 1936 installations. These locks, a comparatively new development, insure practically the same protection for a main-line switch as is offered by interlocking.

Much Highway Crossing Protection

The year 1936 saw a decided increase in the number of installations of automatic protection at highway-railroad grade crossings, a total of 1,071 projects being completed in the United States and Canada, as compared with 628 during the previous year. This increase in the installation of automatic crossing protection was due primarily to the fact that the regular programs of installations made by the railroads at their own expense were augmented by installations financed by federal, state and city funds. Of the 1,071 new crossings protected during 1936, the railroads paid for 369 projects, the federal government 639, the states and provinces 48, and cities or counties 15.

The bulk of the government funds for crossing protection came from the federal treasury, being authorized by the National Industrial Recovery Act, the Public Works Administration, and the Emergency Relief Appropriation Act of 1935. In developing crossing protection programs financed by federal funds, the central states have been most active. Illinois completed a program totaling 233 installations; in Indiana, 95 installations were completed of a total program of 213 crossings; Minnesota made 48 installations; Wisconsin, 44; California, 37; Wyoming, 15; Tennessee, 14; and Vermont, 11. In addition to the programs financed by federal funds, some of the states and provinces paid for some projects. During 1936, Ontario paid for 16 installations; Michigan, 6; and Pennsylvania, 4.

The year 1936 saw an increase in the divergency of opinion in the various states as to the type of protection required. Flashing-light signals, the standard recommended by the Signal Section, A.A.R., were installed most extensively, totaling 1,560 signals. The use of the "Stop" or "Stop on Red Signal" sign, as a part of the flashing-light signal, as recommended by the Signal Section, has now been adopted almost universally, only 66 of the 1,560 flashing-light signals installed last year not being equipped with such signs. The wigwag signal, also one of the standards of the A.A.R., made a strong comeback, totaling 281 signals. The rotating-disk stop

Remote and Centralized Traffic Control Installations Completed in 1936

Road	Location	Miles of Road	Manufacturer	Direct wire or Coded Control	No. of Levers: Desk Type	C.T.C. Type	Power Operated Switches	No. of Signals Controlled
B. & L. E.	Osgood, Pa.	0.6d	Union	DW	..	2	..	4
C. N. G. T. W.	Lansing, Mich.	...	G.R.S.	DW	..	..	2	4
C. & O.	Buchanan, Va., to Springwood*	5.0d	Union	DW	3	..	..	5
	Alleghany, Va., to Tuckahoe, W. Va.‡	...	Union	CD	..	1	2	2
	St. Albans, W. Va., to M.P. 464, W. Va.	1.9d	Union	....	2	..	1	3
C. M. St. P. & P.	Ottumwa, Iowa, to Rutledge	2.8s	Union	DW	..	4	2	8
C. S. S. & S. B.	Davis Siding, Ind., to Audry Siding	3.3s	Union	DW	..	..	..	4
D. & H.	Albany, N. Y., to Watervliet	7.0d	G.R.S.	CD	..	43	40	42
D. L. & W.	Pocono Summit, Pa., to Mount Pocono	...	.....	....	..	..	2	4
D. & R. G. W.	Midvale, Utah, to Roper	6.8d†	G.R.S.	CD	..	11	8	28
Erie	Elmira, N. Y., to "JF" Southport	1.3d	Union	CD	..	8	6	13
L. & N.	Amqui, Tenn., to Maplewood	...	G.R.S.	CD	..	3	2	4
	Corbin, Ky., to Forbes	...	G.R.S.	DW	..	3	1	4
M. P.	Rich Hill, Mo.	...	G.R.S.	DW	..	..	1	4
N. Y. C.	Hudson, N. Y., to Greendale	...	G.R.S.	DW	4	..	1	3
	Vermilion, Ohio	1.5d	G.R.S.	DW	1	..	1	5
	Danbury, Ohio, to Bay Bridge	0.6d	G.R.S.	DW	5	..	4	7
C. C. C. & St. L.	Kenton, Ohio	...	Union	DW	3	..	2	7
	Columbus, Ohio	...	Union	DW	3	..	1	5
N. & W.	Prichard, W. Va.	...	Union	CD	..	6	2	12
	Kermit, W. Va.	...	Union	CD	..	2	2	4
Penna.	Southport, N. Y., to Elmira	1.6s	Union	DW	3	..	1	3
	Spruce Creek, Pa.	1.6t	Union	DW	7	..	1	4
	Perryville, Md., to Oakington	3.5d-f	Union	CD	..	8	7	8
	Nanticoke, Pa., to Lomis	3.5s	Union	DW	9	..	1	4
	E. Liberty, Pa., to Swissvale	2.8f	Union	CD	..	8	4	9
Reading	Bethayres, Pa.	0.3s	G.R.S.	CD	..	3	..	10
		2.0d	.....	....	..	..	..	..
S. P. T. & N. O.	El Paso, Tex.	...	Union	DW	2	..	1	3
T. & P.	Texarkana, Tex., to Springdale	14.3s	G.R.S.	CD	..	10	4	16
U. P.	Menoken, Kan.	...	Union	DW	2	..	1	4
Totals		60.1 30.0d 25.7s 1.6t 2.8f			44	96	86	205

Legend:
In "Miles of Road" column: s = Single track. d = Double track. t = Three track. f = Four track.
* Includes spring switch with FPL at EDT.
† Double track normal and reverse running.
‡ Addition to existing installation.

signal, which is not an A.A.R. standard but which is supplemented by standard flashing lights, is used extensively in Wisconsin, Minnesota and several of the other states, where a total of 315 of these signals were installed. During the year 1936, a total of 32 stop-and-go traffic type signals were installed for the protection of railroad crossings. At some locations where the use of signals alone is not considered adequate, obstructions in the form of automatically-controlled gates or barriers were installed, a total of 33 gates and 6 barriers being placed in service during the year.

Train Control and Cab Signals

Numerous developments and improvements in crossing protection and control arrangements have been brought out during the past year. The introduction of trains operating at high speeds has required the lengthening of control sections for crossing protection, which at the same time extends the duration of the operation of the signals when lower speed trains are operated. To solve this problem, uniform timing systems of control have been developed. Likewise, in areas where trains stop at stations and water tanks or while switching, and cause the signals to operate when no train movement over the crossing is imminent, special controls have been installed to eliminate unnecessary operation of the signals. The year 1936 also saw several improvements in flashing-light crossing signals to improve the range of the light, to control the beam spread to the area of the highway and also to reduce false indications caused by sun phantom. On the Alton and on the Grand Trunk Western, crossing gates operated by semaphore signals were installed as tests and have rendered very good service to date.

During 1936, the most important item in the field of train control and cab signals was the initiation of work on the installation of cab signaling on the Pennsylvania's line between Philadelphia, Pa., and Harrisburg. When this project is completed, this road will have cab signaling in service on its main lines from New York, Washington, D. C., and Atlantic City, N. J., to Pittsburgh, Pa., and from Pittsburgh to Indianapolis, Ind. The only important change in train control installations during 1936 was on the New Haven which received authority from the Interstate Commerce Commission to discontinue operation of the automatic brake application features on its installations and to operate by cab signals in conjunction with wayside signals.

During the year just closed, special train control equipment was installed on several of the new light-weight trains that were placed in service by different roads, the train control and cab signal apparatus being adapted especially for this service. A new feature of train control that was tested on several roads during the year is the time-element reset that is used to reset the train stop equipment after an automatic brake application. Unlike the conventional reset contactor, which is usually mounted where it can be operated only from the ground, this new reset contactor is located in the cab and is equipped with a clockwork mechanism that delays the closing of the contact-controlling electro-pneumatic valve for a predetermined time interval after the resetting lever has been operated. In this manner the I.C.C. requirement, that an automatic brake application may not

Spring Switches Installed During 1936

Railroad	Total No. of Spring Switches Installed	Classification as to Application: End of Passing Track	End of Double Track	Junction	Yard Track	Total No. Equipped with Facing Point Lock	Signal Protection: High Signals	Dwarf Signals
A. T. & S. F.	28	..	1	..	27	..	3	8
C. N.	1	..	1	..	1	..	2	..
C. P.	1	..	..	..	1	1	2	..
C. of N. J.	1	..	..	..	1	..	..	1
C. & O.	6	5	1	..	..	4	3	3
C. & W. I.	1	..	..	..	1	..	..	..
C. M. St. P. & P.	25	18	2	5	..	9	23	12
C. R. I. & P.	1	..	..	..	1	..	1	1
C. S. S. & S. B.	1	..	..	..	..	..	..	..
D. & H.	2	..	..	2	..	..	4	3
D. & R. G. W.	20	1	..	..	19	3	6	3
E. J. & E.	1	..	..	..	1	..	1	..
Erie	6	..	4	..	2	6	12	..
F. E. C.	3	..	..	..	3	..	..	..
G. N.	5	..	..	1	4	5	6	1
I. C.	1	..	1	..	..	..	2	1
L. & A.	1	..	..	..	1	..	..	..
L. & N.	5	..	2	3	..	..	..	2
M. P.	1	..	..	1*	..	..	1	..
Monongahela	1	..	1	..	..	1	1	..
N. Y. C.	3	..	1	2	..	3	5	2
N. Y. N. H. & H.	1	..	1	..	..	1	2	4
N. Y. O. & W.	1	..	1	..	..	..	..	1
N. & W.	18	18	..	..	..	1	17	34
N. P.	2	..	2	..	..	..	4	..
Penna.	3	..	2	..	1	3	2	1
St. L.-S. F.	1	..	..	..	1	..	2	..
Southern	43	36	5	1	1	..	..	1
C. N. O. & T. P.	6	6	..	..	..	..	..	..
A. G. S.	11	10	..	1	..	..	..	..
N. O. & N. E.	6	6	..	..	..	..	..	..
G. S. & F.	1	..	..	1	..	..	..	..
N. O. T.	1	..	..	1†	..	..	..	..
S. J. R. T.	1	..	1	..	..	..	..	..
S. A. L.	2	..	..	1*	1	2	..	1
S. P.	2	..	..	..	2	2	4	1
T. & N. O.	1	..	..	..	..	..	1	..
T. & P.	1	1	..	..	..	..	4	2
W. & L. E.	1	..	..	..	1	1	1	..
Total	216	101	27	19	69	42	109	82

* Wye switch.
† Crossover switch.

Table of Crossing Protection Projects Showing Source of Funds

State	No. of Crossings	Source of Funds: Ry.	Fed.	State	County or city
Alabama	4	..	4	..	..
Arkansas	1	1	..	..	..
California	71	23	37	2	9
Colorado	22	22	..	..	..
Connecticut	8	8	..	..	..
Florida	5	1	4	..	..
Georgia	7	..	7	..	..
Idaho	4	..	4	..	..
Illinois	272	32.5	233	4.5	2
Indiana	116	21	95	..	..
Iowa	31	31	..	..	..
Kansas	13	10	2	1	..
Kentucky	8	4	4	..	..
Louisiana	3	..	3	..	..
Maine	6	4	2	..	..
Maryland	6	..	6	..	..
Massachusetts	4	3	1	..	..
Michigan	23	11	3	6	3
Minnesota	49	1	48	..	..
Mississippi	6	..	6	..	..
Missouri	6	6	..	..	..
Nebraska	4	..	4	..	..
Nevada	2	..	2	..	..
New Hampshire	3	..	3	..	..
New Jersey	7	7	..	..	..
New York	62	62	..	..	..
North Carolina	24	1	23	..	..
Ohio	37	37	..	..	..
Oklahoma	3	3	..	..	..
Oregon	5	3	2	..	..
Pennsylvania	31	17	10	4	..
South Carolina	1	..	1	..	..
South Dakota	11	1	10	..	..
Tennessee	14	..	14	..	..
Texas	12	12	..	..	..
Utah	12	11	1	..	..
Vermont	11	..	11	..	..
Virginia	3	1	2	..	..
Washington	10	1	8	..	1
Wisconsin	51	7	44	..	..
Wyoming	15	..	15	..	..
Alberta	10	1.5	6.4	2.1	..
British Columbia	1	.2	.4	.4	..
New Brunswick	18	2.7	9.9	5.4	..
Nova Scotia	3	.5	1.3	1.2	..
Ontario	45	21	7.3	16.7	..
Prince Edward Island	4	..	2	2	..
Quebec	7	1.8	2.6	2.6	..
Total	1,071	369.2	638.9	47.9	15.0

be released until the train has been brought to a stop, is enforced, without the hazard of requiring a trainman to alight from the cab for the purpose of resetting the equipment.

Tests conducted on the Pittsburgh & Lake Erie, at the request of the Bureau of Safety, Interstate Commerce Commission, demonstrated that the General Railway Signal Company Schedule-2 intermittent inductive automatic train stop equipment would function at 85 m.p.h., to initiate an automatic brake application under the conditions of offset and air-gap obtaining in the operation of Baltimore & Ohio locomotives, equipped with that device, over Pittsburgh & Lake Erie automatic train stop territory, upon which Union Switch & Signal Company inductors are in service. The maximum speed at which the device would function properly, under these conditions, was not determined, since 85 m.p.h was the highest speed attained during the tests.

The Interstate Commerce Commission, during the year, filed three suits, containing five counts, against the Lehigh Valley in various United States courts for alleged violations of its automatic train control orders. The specific instances mentioned in the suits involved the movement of certain locomotives and motor cars backward with the current of traffic, in automatic train stop territory, without automatic train stop protection. The motor cars and locomotives were equipped for operation in the direction of traffic for forward movement only, so that the automatic train control was not operative for backward movements. The railroad settled the suits by confessing judgment and paying the minimum fine on each count, together with the cost. The litigation is of interest because it is the first instance in which the commission has brought suit against a railroad for alleged violations of its automatic control orders.

During 1936, plans and specifications were prepared, and some of the equipment ordered, for an automatic train control installation on the San Francisco-Oakland bridge. This installation includes the bridge and approaches on either side, and multiple-unit cars of both the Southern Pacific Company and the Key System are to be equipped with a speed-control device with automatic cab signals.

Highway-Railroad Grade Crossing Protection Installed in 1936

Railroad	Number of Crossings Protected	Number of Installations Paid by Funds of: Railroad	Federal Government	State, Province or City	Total Number of Signals, Gates and Barriers Installed
Alton	17	2	15	..	35
A. & W. P.	1	..	1	..	4
A. C. L.	9	..	9	..	24
A. T. & S. F.	41	20	21	..	76
B. & O.	34	7	26	1	74
Ban. & Aroos.	1	1	..	..	2
B. & M.	9	1	8	..	25
C. N.	33	8	13	13	44
C. V.	6	4	2	..	12
D. W. & P.	2	..	2	..	4
G. T. W.	11	3.5	4	3.5	28
C. P.	23	3	16.4	3.6	27
C. of Ga.	1	..	1	..	2
C. & O.	13	3	10	..	37
C. & E. I.	16	8	8	..	38
C. & I. M.	1	..	1	..	2
C. & N. W.	43	8	33	2	86
C. & W. I.	3	3	..	..	6
C. B. & Q.	42	4.5	35	2.5	85
C. G. W.	12	11	1	..	24
C. I. & L.	7	3	4	..	14
C. M. St. P. & P.	105	22	83	..	213
C. R. I. & P.	15	3	12	..	32
C. St. P. M. & O.	6	..	6	..	12
C. S. S. & S. B.	5	1	4	..	11
C. & S.	3	2	1	..	6
D. & H.	5	5	..	..	13
D. L. & W.	7	7	..	..	17
D. & R. G. W.	25	24	1	..	25
D. T. & I.	1	1	..	..	3
E. J. & E.	2	1	1	..	4
Erie	15	12	3	..	30
G. N.	12	1	11	..	25
G. B. & W.	2	1	1	..	2
G. M. & N.	8	..	8	..	18
I. C.	30	3	27	..	68
Y. & M. V.	1	..	1	..	2
I. T.	12	..	11	1	21
Indiana	7	1	6	..	27
K. & I. T.	1	1	..	..	2
L. & N. E.	4	2.5	..	1.5	13
L. V.	3	2.5	..	0.5	5
L. & A.	1	..	1	..	2
L. & N.	7	..	7	..	25
Me. C.	10	3	7	..	25
M. St. P. & S. S. M.	14	..	14	..	30
M-K-T	2	2	..	..	3
M. P.	7	2	5	..	14
M. I.	1	..	1	..	2
N. C. & St. L.	7	..	7	..	14
N. Y. C.	33	31.5	1	0.5	70
C. C. C. & St. L.	24	1	23	..	50
I. H. B.	1	..	1	..	2
M. C.	33	16.5	1	15.5	66
P. & E.	7	..	7	..	16
Rutland	1	1	..	..	2
N. Y. C. & St. L.	18	5	13	..	41
N. Y. N. H. & H.	7	7	..	..	14
N. Y. O. & W.	2	2	..	..	4
N. & W.	4	1	3	..	12
N. P.	16	..	15	1	32
N. W. P.	2	..	2	..	5
Penna.	67	30.5	35	1.5	172
L. I.	7	7	..	..	22
P. M.	13	5.5	2	5.5	36
Reading	1	0.5	..	0.5	3
S. N.	4	..	3	1	7
St. L.-S. F.	5	2	3	..	12
S. D. & A. E.	1	..	1	..	2
S. A. L.	10	1	9	..	22
Southern	26	1	25	..	53
S. P.	27	21	..	6	54
T. & N. O.	4	3	1	..	6
P. E.	12	1	10	1	16
T. R. R. A. St. L.	5	..	5	..	10
T. & P.	4	4	..	..	7
U. P.	27	14	13	..	49
Virginian	1	..	1	..	2
Wabash	31	2.5	28	0.5	66
W. M.	6	..	6	..	14
W. P.	6	..	3	3	14
W. & L. E.	23	23	..	..	40
Total	1,071	369.2	638.9	98.6	2,234

Prospects Good for 1937

The outlook is for markedly increased signal construction in 1937. Automatic block signaling already authorized on three roads alone will equal the total mileage installed in 1936. Several roads are planning extensive rehabilitation programs to modernize automatic signaling and add aspects on high-speed routes. One road has six centralized control installations in its budget. Numerous plans are under way for the consolidation of interlockings. At least two car retarder installations are included in budgets for 1937. The installation of crossing protection will continue on a large scale; North Carolina has a program of 40 crossings, Indiana a second program of about 100 crossings, and Iowa, Texas, Arkansas, Wyoming, Colorado, the Dakotas and other states are working on plans for the coming year. It is anticipated that the demand for signal materials during the year will be such as to make prompt deliveries difficult.

Comparison of Annual Signaling Construction

Types of Equipment	Number of Units Completed Each Year: 1931	1932	1933	1934	1935	1936
Automatic block signals	3,501	617	1,189	372	749	838
Highway crossing signals	2,368	879	1,010	768	1,252	2,234
Levers of interlocking	2,701	611	782	307	468	554
Levers added at rebuilt plants	162	124	106	433	182	99
Levers of remote and centralized control	653	93	159	141	93	140
Power-operated switches in remote and centralized control	412	63	67	89	50	86
Signals controlled in remote and centralized control	883	139	228	198	124	205
Signals in automatic interlockings	410	251	134	152	124	117
Spring switches	122	57	42	47	79	216
Number of retarders	41	3	3	..	..	..
Power switches in retarder yards	96	..	..	..	..	..
Totals	11,349	2,837	3,720	2,507	3,121	4,489

Improved Service Is Feature of 1936 T. & T. Activity

Carrier-current, printing-telegraph, and long-distance telephone circuit mileage increased — Activity reaches five-year high

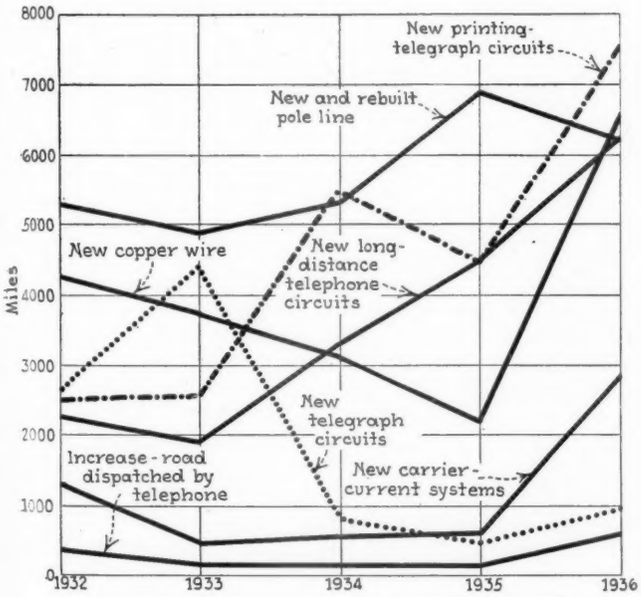
By E. J. Phillips

Associate Editor

New Lines Wire Mileage Shows Increase

DISTINCT increases in carrier-current, printing-telegraph, and long-distance telephone circuit mileages, as reported by 115 railroads in the United States and Canada for the year 1936, indicate the requirements of a new era in railroading. Increased freight and passenger train speeds and better all-around service have required the provision of better communication facilities. This work apparently acquired new life on the railroads during the last year. Reports from the railroads show almost twice as much activity in the provision of additional, faster, and otherwise improved message service in both the telephone and telegraph fields as in 1935. Activity was greater than it has been at any time during the last five years, with indications that a continuation of the upturn may be expected.

The curves in the accompanying graph illustrate strikingly how activity has been increasingly renewed or continued in all but one phase of the work. In the latter, the construction and rebuilding of pole lines, activity was continued, but to a lesser degree than in 1935. It would seem that the outstanding conclusion to be drawn from this chart is that increased use is being made of those features which provide increased facilities without requiring comparable construction or extension of plant. Considerable increase in mileage was shown for long distance telephone circuits, carrier-current circuits, and printing-telegraph circuits. Although less pole line was built or rebuilt during 1936, almost three times as much copper wire was strung in 1936 as in 1935.



Comparison of Activity in T. & T. Field, 1932-1936

Comparative Increases

Figures available indicate that the activity in 1936, as compared with that during 1935, included 200 per cent more new copper wire mileage, 260 per cent more miles of road dispatched by telephone, 40 per cent more long-distance telephone circuit mileage, 105 per cent more telegraph circuit mileage, 70 per cent more printing-telegraph circuit mileage, and 370 per cent more miles of carrier-current systems. Construction of new pole line and the replacement and reconstruction of old pole line lagged behind 1935 by 12 per cent, indicating that the additional long-distance telephone and message facilities have been obtained primarily by the rearrangement of existing circuits rather than by extensive new construction.

Outstanding figures for new or rebuilt railroad-owned pole line were shown by the Chesapeake & Ohio, report-

ing 530 miles, and by the Louisville & Nashville, reporting 519 miles. The Georgia reported the greatest addition of new or rebuilt commercially-owned pole line, with 308 miles added during 1936. Major items in increased jointly-owned new or rebuilt pole line were 762 miles reported by the Canadian National, 384 miles reported by the Santa Fe, and 345 miles reported by the Georgia.

Probably the figures most indicative of increased activity in the telegraph and telephone field were those shown by the reports of the mileage of new copper wire, which increased from 2,205 miles installed in 1935 to 6,594 miles installed in 1936. Increases occurred on both railroad-owned and commercially-owned lines. The Pennsylvania reported a total of 740 miles of new copper wire on railroad-owned lines, and the Georgia 738 miles, while the largest single item of increased copper wire mileage on commercially-owned lines was 478 miles reported by the Seaboard Air Line.

Long-distance telephone circuits increased 6,250 miles in 1936, as compared to a 4,445 increase in 1935. The 1936 figure is particularly illustrative of the increased activity in the telephone field when it is compared with the figure of 1,923 miles for 1933. Outstanding increases were shown by the Burlington, which reported 2,362 new miles of long-distance telephone circuits, and by the Rock Island which reported 953 miles. The

Table A—Principal Increases in Plant Facilities During 1936, As Compared with 1935

	1936	1935
Miles of new or rebuilt pole line:		
Railroad owned	2,040	1,577
Commercially owned	2,357	3,593
Jointly owned	1,808	1,766
Total	6,205	6,936
Miles of new copper wire:		
Railroad owned	4,688	1,662
Commercially owned	1,906	543
Total	6,594	2,205
Gross increase in miles of road dispatched by telephone	600	166
Increase in miles of long-distance telephone circuits	6,250	4,445
New mileage of telegraph circuits, all types	966	472
Increase in miles of printing telegraph circuits	7,546	4,436
Number of new printing telegraph machines	70	83
Increase in miles of new carrier-current telephone in	2,844	604

Burlington mileage was obtained by constructing 428 miles of wire, rearranging existing wires, and superimposing phantom circuits and carrier circuits. The Rock Island obtained 364 miles by imposing a carrier circuit on a telephone train dispatching circuit, 406 miles of phantom circuit by transposing existing physical wires, and 183 miles of physical circuit by transposing existing pairs.

An increase greater than any that occurred in 1932, 1933, 1934, or 1935 was reported for miles of road dispatched by telephone, 600 additional miles being reported for 1936 in comparison with 166 in 1935, 174 in 1934, 178 in 1933, and 389 in 1932. Of the 600 miles reported for 1936, the Seaboard Air Line accounted for 429 miles.

Although new mileage of telegraph circuits showed an increase over the mileage reported for either 1935 or 1934, activity in this phase of the field remained substantially below the comparatively high figure of 4,421 miles reported for 1933. Almost half of the 966 new miles of circuits reported for 1936 were reported by the Canadian National, with 411 miles. The New Haven completed 185 new miles of telegraph circuits, while the Southern reported 148 miles.

A spurt of activity in the application of carrier-current systems to railroad telephone and telegraph circuits was featured by the comparatively long mileages reported by four roads, the Burlington reporting 1,465 miles, the Canadian National 604, the Rock Island 491, and the St. Louis-San Francisco 284. The Burlington installed circuits between Chicago and St. Paul, Minn., between Chicago and Omaha, Neb., and between Omaha and Denver, Colo. The Rock Island provided circuits between Kansas City, Mo., and El Reno, Okla., while the Frisco installed a carrier-current system between Springfield, Mo., and Memphis, Tenn. The total increase of 2,844 miles is greater than the activity reported in this phase of the field for either 1932, 1933, 1934, or 1935.

Printing Telegraph-Train Communication

The installation of printing-telegraph systems also showed renewed activity during 1936, a total of 7,546 new circuit miles having been installed. The Santa Fe converted service on existing wires to obtain 1,917 new

Table B—Principal Copper Wire Installations Completed in 1936

	Miles of New Copper Wire		
	Railroad Owned	Commercially Owned	Total
Atchison, Topeka & Santa Fe	384	—	384
Atlantic Coast Line	182	100	282
Canadian National	—	450	450
Canadian Pacific	312	—	312
Chicago & Eastern Illinois	231	100	331
Chicago, Burlington & Quincy	428	—	428
Georgia	738	345 (Joint)	1,083
Norfolk & Western	244	88	332
Pennsylvania	740	29	769
Seaboard Air Line	11	478	489
Southern Pacific	175	166	341
Texas & New Orleans	273	24	297

miles of printing-telegraph circuit, with a total addition of 20 machines. The Missouri Pacific reported additional mileage of 1,877 and 6 new machines. The Texas & Pacific utilized existing telegraph circuits to obtain 861 miles of circuit for 4 additional machines. The Denver & Rio Grande Western installed 14 new machines and provided 749 miles of circuit by converting 745 miles of Morse duplex circuit carried on telephone train dispatching pair and by simplexing 4 miles of telephone pair. The 7,546 miles of circuit completed during 1936 is almost 3 times as great as the 2,528 miles reported in 1932.

Interest in and the development of systems for train

Table C—Printing Telegraph Installations Completed in 1936

Railroad	Miles of Circuit	Number of Machines
Atchison, Topeka & Santa Fe	1,917	20
Baltimore & Ohio	335	2
Chicago, Burlington & Quincy	538	4
Chicago, Rock Island & Pacific	358	2
Delaware, Lackawanna & Western	391	2
Denver & Rio Grande Western	749	14
Missouri Pacific	1,877	6
Pennsylvania	397	11
Texas & Pacific	861	4

communication continued actively during the year, forming one of the chief topics of discussion during the annual convention of the T. & T. Section of the A. A. R. during October. The most recent development is that of the Union Switch & Signal Company which has just announced a two-way telephone communication system for use between the ends of a freight train, between trains and stations, between trains and towers, and between different trains on the same or adjacent tracks. In July of last year, the first complete automatic telephone exchange system was installed, providing communication facilities between various locations, on a 12-car streamlined passenger train. Various other similar facilities have been provided, or are being planned, for many of the new first-class passenger trains.

The Railways Have Been Purchasing Much Modern Highway Equipment

Widespread Activity Features Motor Transport Year

Railways increase their holdings and consolidate positions in the highway field

By Charles Layng

Motor Transport Editor

THE year 1936 was characterized by numerous developments of importance in the motor transport field. Among the more outstanding of these were the decision of the Interstate Commerce Commission of October 30, approving the proposals of eastern carriers for widespread pick-up and delivery service; the purchase by the railways of many bus and truck lines, with numerous additional applications for such purchase still before the commission; the trend toward streamlining and air-conditioning in the bus field, and modernization of equipment in truck transport; and the formation of the National Trailways, a new transcontinental bus system, which is largely railway owned.

In 1936, as in 1935, the railways again broke all records for increased motor transport activity, and the number of automotive units purchased increased materially during the year. The increase in the use of automotive equipment in non-revenue railway service, such as for maintenance of way, stores department and water service activities, was particularly marked.

A further feature of the year was the distinct trend toward direct ownership of highway equipment rather than by operation through contracts with independent truckers. Coupled with this and indicative of the same trend, was the selection of railway men to head several large motor transport activities. Examples of this were the appointment of the general superintendent of transportation of the Atchison, Topeka & Santa Fe as head of the newly-formed motor transport division of that railway, and the election of the assistant to the operating vice-president of the Chicago, Burlington & Quincy as president of the Burlington Transportation Company, in addition to his railway duties. In the first case, the new appointee will take charge of the co-ordination of the activities of the railway and its large and recently acquired motor transport holdings. In the second instance, the new officer will direct the activities of a large and flourishing bus company, with a growing freight division. In both cases, the object was the same, to place the highway activities of the railways in charge of men who would see to it that these operations would be conducted with the same dependability that characterizes railroad operation.

Joint Purchases

Another interesting development, to which the Interstate Commerce Commission has not yet given its final approval, was the joint purchase of a truck line by several railways. Because of the wording of the regulatory act governing motor trucks, a question was raised as to the legality of this proceeding. However, after a hearing in which all phases of the problem were presented, an I.C.C. examiner has given the purchase his unqualified approval.

The case in point was the acquisition of the Union Transfer Company of Omaha, operating truck routes in the Middle West, jointly by the Chicago, Burlington & Quincy, the Chicago & North Western and the Union Pacific. Each of these roads already has large motor transport holdings, and it was their announced intention to increase these holdings by the joint purchase of other truck lines, giving all of the railways in the territories served an opportunity to acquire an interest. There seems little doubt, if this case is decided favorably, that next year will see considerable activity in the purchase of truck lines jointly by railways.

During the year, the Interstate Commerce Commission issued its report on the financial interests of railways in motor transport companies, as of May 1, 1936, the details of which were published in the Motor Transport Section of the *Railway Age* for November 28. While, unfortunately, as was pointed out in this summary, the report was not complete, it did contain enough information of a comprehensive nature to indicate the large increase in such holdings since the last similar report was issued some three years ago.

National Trailways Formed

The most outstanding development in the rail-bus field during 1936 was the formation last spring of the National Trailways System. This organization provides another transcontinental bus system, in which the railways are heavily interested, and in which such lines as the Atchison, Topeka & Santa Fe; the Chicago, Burlington & Quincy; the Denver & Rio Grande Western; and the Missouri Pacific were prime movers. Co-ordinated merchandising of service, advertising, schedules and, to a certain extent, of operations are provided under the new set-up as well as through rates and through ticketing arrangements. The announced intention of the system to provide improved station facilities has already borne fruit in the construction of modern terminals at Chicago, Ill., St. Louis, Mo., and Little Rock, Ark., as well as at several other places, and this policy is being continued. Many independent companies not owned by railways have joined the National Trailways System to obtain the benefits of its co-ordinated activities, and, at present, the system includes several trans-continental routes between New York and Los Angeles, a large network of lines in the Southwest, and much intermediate coverage.

The year also witnessed the announcement by the Santa Fe of its intention to re-enter competition for San Francisco-Los Angeles passenger traffic. Prior to federal control, the Santa Fe operated train service between these points, but its route via Barstow was materially longer than either of the two Southern Pacific routes. This train service was abandoned during federal control and has not since been resumed. What the Santa Fe now proposes is the operation of buses on a high-speed highway between Los Angeles and Bakersfield, across the base of the triangle which formerly accounted for the Santa Fe's excess rail mileage, and to operate high-speed streamlined trains from that point to Richmond, Cal., on the eastern shore of San Francisco bay. A bus service is planned across the new bridge to convey passengers to and from San Francisco. It is proposed further to place in effect through rates of 1½ cents per mile for the co-ordinated movement. This application by the Santa Fe has met with considerable opposition from competing railways and bus lines. It has been the subject of protracted hearings before the California Railroad Commission, which hearings, at this writing, are still continuing, although a definite decision is expected shortly.

A New Type of Bus-Truck That Has Proved Successful in Dual Service in Branch Line Territory

The Santa Fe also has an application before the I.C.C. to acquire two bus routes operating between Phoenix, Ariz., and Salt Lake City, Utah. The railway plans to co-ordinate these lines with its rail service in a way that will open up picturesque and little-known tourist lands in northern Arizona and southern Utah.

Modern Equipment

As shown in the accompanying table, 738 new streamlined, and, in some cases, air-conditioned buses, and 1,730 units of highway freight equipment were purchased by the railways and their highway affiliates during 1936. Included in the freight equipment were 1,276 motor

Trailers Provide a Desirable Flexibility in Many Rail-Highway Co-ordination Operations

trucks, 220 tractors and 234 trailers. Also, 1936 orders for 177 automobiles were reported. The foregoing compare with 1935 orders for 342 buses, 547 trucks, 106 tractors, 174 trailers and 127 automobiles.

The Greyhound Lines affiliated with railroads placed the largest orders in the bus field, including more than 250 General Motors coaches. Another large buyer was the Baltimore & Ohio, which purchased a fleet of 28 streamlined, air-conditioned coaches from the White Motor Company, 6 for use in through service by its West Virginia Transportation Company and 22 for rehabilitating its train connection bus service in the New York metropolitan district. This service, incidentally, celebrated its tenth anniversary of successful operation in August, 1936.

The White Motor Company also sold a considerable fleet of buses to various transportation companies for national park services. Since such services depend almost entirely upon railway passengers for their business, the revival in railway passenger service resulted in excellent business for these lines this year, with prospects of an even better season next year. The anticipation of good business this season that brought about the purchase of this fleet proved to be amply justified.

Several new ideas in rail-highway passenger service have been developed. A number of "auto-railers," suitable for operation both on rails or on the highway, have been sold during the year. Those in maintenance of way service on the Pennsylvania and one in freight service on the Chicago, Attica & Southern have shown good results. The units in passenger service on the Arlington & Fairfax were not installed until December 9 and thus have not been in use for a long enough period to supply sufficient data for an accurate prediction as to their ultimate possibilities.

New Services

Another innovation in the co-ordination of highway with rail service during the year was introduced by the Cedar Rapids & Iowa City electric railway, which inaugurated the pick-up and delivery of passengers in June. Under this arrangement, the passenger buys a taxi coupon for 10 cents additional with his rail ticket, and this entitles him to taxi service anywhere within the city limits of Cedar Rapids or Iowa City. Passengers handled showed more than a 100 per cent increase shortly after this arrangement, together with lower fares and improved schedules, was put into effect. In somewhat similar manner, the New York Central has provided cheap and convenient facilities for its rail patrons for hiring autos at some 20 key cities.

All-expense bus tours proved increasingly popular during 1936 with many of the railway bus subsidiaries serving vacation territory. The Maine Central Transportation Company operated a number of such tours last summer that were well patronized and plans an expansion of such services in 1937. This company has also effected considerable rail-bus co-ordination, as well as rail-bus-steamship, and rail-bus-airway combinations.

New Types of Containers Developed by the Illinois Manufacturers Association During the Year

The Maine Central operates "snow buses" in the winter to various ski fields, and these have proved popular with winter sports enthusiasts.

In still another area, the Seaboard Air Line was able to provide additional cross-Florida service without addition to its train mileage by rail-highway co-ordination. Between the east and west coasts this line operates only a through night train. The competition of buses operating daylight services on the Tamiami trail was so keen that a new cross-Florida day service was provided by handling passengers approximately half way by train, and entering into a contract with a bus company to handle them by highway from that point to West Coast resorts. Similarly, a bus leaves these resorts every morning to connect with an afternoon train into Miami.

Pick-Up and Delivery

Collection and delivery service for merchandise freight, together with certain station-to-station trucking operations providing for more flexible handling than would be possible under all-rail movement, have become integral parts of the transportation of less-than-carload merchandise. Such services continued to attract tonnage and to be expanded throughout the country during the year.

After protracted efforts by the railways, the Interstate Commerce Commission finally approved their plan to make pick-up and delivery practically universal in Official Classification territory. Following a sudden suspension of pick-up and delivery tariffs on April 1, the commission began a general investigation of the plan on June 1, and, after exhaustive testimony had been presented and hundreds of witnesses examined, rendered a decision on October 30, approving the proposals of the eastern carriers, with certain qualifications. This should bring about a marked increase in rail-highway co-ordination in the east, where many such moves are already under way.

The Pennsylvania announced and made partially effective during the year, its plan for a system-wide line-up of 75 concentration and distribution points, from and to which merchandise would be handled by truck. Merchandise will be sent to these points by rail, for distribution to neighboring points by truck, and freight will likewise be picked up at these points for consolidation and rail movement outbound.

On the Pacific Coast, the Pacific Motor Transport Company, highway subsidiary of the Southern Pacific, has continued its program of expansion. During the year this company has taken over the handling of all freight for a large automobile assembly plant in Los Angeles, even to the extent of providing chauffeurs for drive-away cars.

The handling of trailers on flat cars by the railways for private trucking companies gained considerable impetus during the year, when the Chicago Great Western established such truck-ferry service between Chicago and the Twin Cities. Shortly thereafter, the Chicago, North Shore & Milwaukee re-established similar service between Chicago, Racine and Milwaukee, which had been abandoned for two years following an adverse interpretation of the law by the Wisconsin Commission, which latter body reversed its decision early this fall.

Container service continued through the year approximately as before, without any particular expansion in the use of this form of transportation. Experimentation continues unabated in this field, however, and several companies are conducting research along these lines. The Illinois Manufacturers Association developed a container during the year which is receiving thorough try-outs to determine its practicability in actual operations.

In general, it may well be said and thoroughly substantiated, that 1936 was a banner year in rail-highway co-ordination. All signs point to continued record-breaking progress along all the aforementioned lines through 1937.

Orders for Highway Vehicles

Purchaser	No.	Type of Vehicle	Seating capacity or truck capacity in tons	Where to be used	Manufacturer
Atchison, Topeka & Santa Fe	2	Bus	34	Rev.	A. C. F. Motors
	2	Bus	24	Rev.	A. C. F. Motors
Santa Fe Transportation Company (California)	2	Bus	24	Rev.	A. C. F. Motors
	2	Bus	32	Rev.	A. C. F. Motors
	1	Truck	2 ton	Rev.	Dodge
	1	Truck	1½ ton	Rev.	Dodge
Southern Kansas Stage Lines Company	6	Bus	16	Rev.	Chevrolet
	2	Bus	33	Rev.	General Motors
	2	Bus	21	Rev.	Chevrolet
	1	Bus	28	Rev.	A. C. F. Motors
	1	Bus	30	Rev.	White
	6	Truck	1½ ton	Rev.	Int. Harvester
	5	Truck	1½ ton	Rev.	General Motors
	2	Truck	2 ton	Rev.	General Motors
	11	Tractor	2 ton	Rev.	Dart
	7	Tractor	2 ton	Rev.	General Motors
	1	Tractor	1½ ton	Rev.	General Motors
	5	Trailer	4½ ton	Rev.	General Motors
	4	Trailer	4½ ton	Rev.	Dart
	2	Trailer	4½ ton	Rev.	Spencer Trailer Co.
	3	Automobile	5	Co. Business	Chrysler
	1	Automobile	5	Co. Business	Ford
Santa Fe Trails of Illinois, Inc.	6	Bus	28	Rev.	A. C. F. Motors
	3	Bus	33	Rev.	General Motors
	2	Bus	36	Rev.	A. C. F. Motors
	1	Bus	16	Rev.	Int. Harvester
	1	Bus	16	Rev.	Chevrolet
	1	Automobile	5	Co. Business	Chrysler
Southern Kansas Greyhound Lines, Inc.	1	Bus	16	Rev.	Chevrolet
	1	Automobile	5	Co. Business	Chrysler
Western Transit Company	1	Tractor	2 ton	Rev.	Dart
	1	Trailer	4½ ton	Rev.	Spencer Trailer Co.
Central Arizona Transportation Lines, Inc.	3	Bus	25	Rev.	Kenworth-Wentin
Cardinal Stage Lines Company	3	Bus	33	Rev.	General Motors
	1	Bus	25	Rev.	General Motors
	1	Bus	16	Rev.	Int. Harvester
	1	Truck	1½ ton	Co. Business	Ford
Santa Fe Trail Stages, Inc.	3	Bus	33	Rev.	General Motors
	2	Bus	7	Rev.	Chrysler
	2	Automobile	5	Co. Business	Chrysler
Atlanta, Birmingham & Coast	1	Bus	26	Co. Business	Dodge

Purchaser	No.	Type of Vehicle	Seating capacity or truck capacity in tons	Where to be used	Manufacturer
Baltimore & Ohio	20	Bus	22	Rev.	White
	6	Bus	25	Rev.	White
	2	Bus	16	Rev.	White
	1	Bus	21	Rev.	Dodge
	1	Truck	4 ton	Co. Business	Int. Harvester
	1	Truck	½ ton	Co. Business	Int. Harvester
	3	Automobile	.....	Co. Business	Ford
	1	Automobile	.....	Co. Business	Chevrolet
	1	Automobile	.....	Co. Business	Plymouth
Bangor & Aroostook					
Bangor & Aroostook Transportation Company	1	Bus	29	Rev.	.....
Bessemer & Lake Erie	1	Automobile	7	Co. Business	Dodge
Cambria & Indiana	1	Truck	1½ ton	Co. Business	Dodge
Chesapeake & Ohio	3	Truck	1½ ton	Co. Business	Ford
	1	Truck	2-3 ton	Co. Business	Int. Harvester
	1	Truck	1½-2 ton	Co. Business	Int. Harvester
	1	Truck	1½ ton	Co. Business	Dodge
	1	Automobile	5	Co. Business	Chevrolet
	1	Automobile	5	Co. Business	Hudson
Chicago & Western Indiana	1	Truck	1½ ton	Co. Business	Int. Harvester
	1	Truck	¾ ton	Co. Business	Diamond T
Chicago, Burlington & Quincy	1	Truck	.....	Co. Business	Ford
	3	Automobile	5	Co. Business	Ford
	2	Automobile	5	Co. Business	Chevrolet
	2	Automobile	2	Co. Business	Ford
	1	Automobile	5	Co. Business	Buick
Burlington Transportation Company	14	Bus	33	Rev.	General Motors
	4	Bus	11	Rev.	Fitzjohn Body Co.
	1	Bus	25	Rev.	Dittmar Mfg. Co
	7	Truck	1½ ton	Rev.	Int. Harvester
	11	Tractor	3 ton	Rev.	Int. Harvester
	5	Tractor	3 ton	Rev.	White
	2	Tractor	1½-2 ton	Rev.	Int. Harvester
	2	Tractor	2½ ton	Rev.	White
	17	Trailer	.....	Rev.	Fruehauf
	1	Automobile	2	.....	Chevrolet
Chicago Great Western	1	Truck	1½ ton	Co. Business	Dodge
Chicago, Indianapolis & Louisville	2	Automobile	5	Rev.	Chevrolet
Monon Transportation Company	1	Bus	21	Rev.	General Motors
Chicago, Milwaukee, St. Paul & Pacific	2	Bus	11	.....	.....
	1	Bus	12	.....	.....
	3	Truck	1½ ton	.....	.....
	20	Automobile	5	.....	.....
	1	Automobile	3	.....	.....
Chicago North Shore & Milwaukee	6	Bus	23	Rev.	White
Chicago, St. Paul, Minneapolis & Omaha					
Wilson Transportation Company	1	Truck	2½ ton	Rev.	General Motors
	1	Truck	1½ ton	Rev.	General Motors
	1	Truck	½ ton	Rev.	General Motors
Chicago, South Shore & South Bend	3	Bus	29	Rev.	Fageol
	1	Bus	16	Rev.	Studebaker
	2	Truck	1½ ton	Co. Business	Ford
	2	Truck	1 ton	Co. Business	Dodge
	1	Truck	2 ton	Co. Business	Studebaker
	1	Truck	1½ ton	Co. Business	Studebaker
	1	Truck	1 ton	Co. Business	Graham-Paige
	3	Tractor	7 ton	Rev.	White
	18	Trailer	10 ton	Rev.	La Peer
	3	Automobile	.....	Co. Business	Ford
	3	Automobile	.....	Co. Business	Studebaker
	1	Automobile	.....	Co. Business	Chevrolet
Cincinnati, New Orleans & Texas Pacific	1	Truck	1½ ton	Co. Business	Chevrolet
Cornwall	1	Truck	1½ ton	Co. Business	Dodge
Colorado & Southern					
Denver & Interurban Motor Company	2	Bus	29	Rev.	General Motors
Cumberland & Pennsylvania	1	Truck	1½-2 ton	Co. Business	Int. Harvester
	1	Automobile	2	Co. Business	General Motors
Delaware, Lackawanna & Western	1	Truck	1½ ton	Co. Business	Ford
Detroit & Mackinac	1	Truck	1½ ton	Co. Business	Ford
	1	Automobile	.....	Co. Business	Ford
Elgin, Joliet & Eastern	2	Truck	1½ ton	Co. Business	Int. Harvester
	1	Truck	2 ton	Co. Business	Int. Harvester
Erie	2	Truck	1½ ton	Co. Business	Chevrolet
	2	Truck	1½ ton	Co. Business	Ford
	1	Truck	1½ ton	Co. Business	Diamond T
	7	Automobile	5	Co. Business	Plymouth
	5	Automobile	5	Co. Business	Chevrolet
	2	Automobile	2	Co. Business	Chevrolet
	2	Automobile	5	Co. Business	Ford
	1	Automobile	2	Co. Business	Ford
	1	Automobile	5	Co. Business	Buick
	1	Automobile	5	Co. Business	Dodge
	1	Automobile	5	Co. Business	Oldsmobile
	1	Automobile	5	Co. Business	Nash
	1	Automobile	5	Co. Business	Hudson
Fonda, Johnstown & Gloversville	10	Bus	21	Rev.	General Motors
	2	Bus	32	Rev.	General Motors
Great Northern					
Northland Greyhound Lines, Inc.	40	Bus	36	Rev.	General Motors
	8	Bus	10	Rev.	Ford
	2	Automobile	.....	Co. Business	Ford
Gulf, Mobile & Northern	1	Bus	22	Rev.	Ford
Gulf Transport Company	4	Bus	24	Rev.	.....
	1	Bus	13	Rev.	Chevrolet
	2	Truck	1½ ton	Rev.	Chevrolet
	1	Truck	1½-2 ton	Rev.	White
	1	Truck	.....	Rev.	Reo
	1	Trailer	.....	Rev.	Reo
Illinois Terminal	4	Bus	21	Rev.	Ford
Lake Superior & Ishpeming	1	Automobile	.....	Co. Business	Chevrolet
Lehigh & New England	2	Automobile	.....	Co. Business	General Motors
Lehigh Valley	1	Truck	1½ ton	Co. Business	Chevrolet
	1	Truck	¾ ton	Co. Business	Ford
	1	Truck	½ ton	Co. Business	Chevrolet
	1	Automobile	5	Co. Business	Chevrolet
	1	Automobile	5	Co. Business	Buick
	1	Automobile	2	Co. Business	Ford
	1	Automobile	5	Co. Business	Plymouth
Long Island	1	Rail-Highway Truck	1½ ton	Co. Business	.....
Minneapolis, Northfield & Southern	1	Automobile	4	Co. Business	Chevrolet
	1	Automobile	2	Co. Business	Chevrolet
	1	Automobile	4	Co. Business	Ford
Missouri Pacific					
Missouri Pacific Transportation Company	20	Bus	33	Rev.	.....
	5	Bus	29	Rev.	.....

Purchaser	No.	Type of Vehicle	Seating capacity or truck capacity in tons	Where to be used	Manufacturer
New York Central	15	Truck	1½ ton	Co. Business	.....
	3	Truck	3½ ton	Co. Business	.....
	2	Truck	3 ton	Co. Business	.....
	2	Truck	½ ton	Co. Business	.....
	1	Truck	4 ton	Co. Business	.....
	1	Truck	2½ ton	Co. Business	.....
	1	Truck	2 ton	Co. Business	.....
	1	Truck	1 ton	Co. Business	.....
Central Greyhound Lines	50	Bus	36	Rev.	General Motors
	1	Bus	25	Rev.	Leland Motors
	1	Bus	29	Rev.	General Motors
	1	Bus	11	Rev.	Chevrolet
	12	Automobile	2	Co. Business	Ford
New York, Chicago & St. Louis	1	Automobile	5	Co. Business	Plymouth
	1	Automobile	5	Co. Business	Ford
New York, New Haven & Hartford	1	Automobile	5	Co. Business	.....
Berkshire Street Railway	4	Bus	30	Rev.	.....
Springfield Street Railway	6	Bus	30	Rev.	.....
	5	Bus	32	Rev.	.....
	4	Bus	35	Rev.	.....
	1	Truck	1 ton	Co. Business	.....
County Transportation Company	10	Bus	30	Rev.	.....
	3	Bus	20	Rev.	.....
	1	Automobile	5	Co. Business	.....
Berkshire Motor Coach Lines	4	Bus	11	Rev.	.....
Connecticut Company	79	Bus	30	Rev.	.....
	28	Bus	20	Rev.	.....
	6	Bus	23	Rev.	.....
	5	Bus	28	Rev.	.....
	5	Bus	25	Rev.	.....
	1	Truck	½ ton	Co. Business	.....
	1	Truck	1 ton	Co. Business	.....
	1	Truck	3 ton	Co. Business	.....
	4	Automobile	5	Co. Business	.....
New York, Westchester & Boston	1	Truck	1½ ton	Co. Business	General Motors
Norfolk & Western	4	Truck	1½ ton	Co. Business	Chevrolet
Norfolk Southern					
Norfolk Southern Bus Corporation	2	Bus	33	Rev.	A.C.F. Motors
	1	Bus	33	Rev.	General Motors
	1	Bus	33	Rev.	White
	1	Truck	1½ ton	Rev.	Chevrolet
Northern Pacific	1	Bus	33	Rev.	General Motors
	1	Bus-Truck	1 Ton-9 Pass.	Rev.	Int. Harvester
	3	Truck	3 ton	Rev.	Int. Harvester
	2	Truck	4 ton	Rev.	Int. Hervester
	1	Truck	8 ton	Rev.	White
	1	Truck	7 ton	Rev.	Int. Harvester
	1	Trailer	7 ton	Rev.	Fruehauf
	1	Automobile	5	Co. Business	Chevrolet
Yellowstone Park Transportation Company	27	Bus	14	Rev.	White
Northwestern Improvement Company	1	Truck	1½ ton	Rev.	General Motors
	1	Automobile	5	Rev.	Chrysler
Pacific Electric	18	Bus	41	Rev.	General Motors
	16	Bus	25	Rev.	Twin Coach
	15	Bus	29	Rev.	Mack
	3	Bus	31	Rev.	Twin Coach
	2	Bus	22	Rev.	Patchetts & Carstensen
Pennsylvania	8	Truck	1½ ton	Co. Business	.....
	3	Rail-Highway Truck	1½ ton	Co. Business	.....
	2	Truck	7 ton	Co. Business	.....
	2	Truck	2 ton	Co. Business	.....
	1	Truck	2¾ ton	Co. Business	.....
	1	Truck	3 ton	Co. Business	.....
	1	Truck	4 ton	Co. Business	.....
	1	Truck	5 ton	Co. Business	.....
	1	Crane Truck	7 ton	Co. Business	.....
	1	Rail-Highway Truck	5 ton	Co. Business	.....
	1	Tractor	.....	Co. Business	.....
	2	Trailer	.....	Co. Business	.....
	1	Automobile	7	Co. Business	.....
	1	Automobile	6	Co. Business	.....
	1	Automobile	5	Co. Business	.....
Pennsylvania Trucking Affiliates	70	Truck	Less Than 3 ton	.....	.....
	46	Truck	3-5 ton	.....	.....
	93	Truck	5-10 ton	.....	.....
	22	Tractor	Less Than 3 ton	.....	.....
	6	Tractor	3-5 ton	.....	.....
	42	Tractor	5-10 ton	.....	.....
	67	Trailer	5-10 ton	.....	.....
	1	Trailer	Over 10 ton	.....	.....
Pennsylvania Greyhound Lines Inc.	50	Bus	36	Rev.	General Motors
Pennsylvania-Reading Seashore Lines	5	Bus	31	Rev.	Superior Body Co.
Pere Marquette	2	Truck	.....	Co. Business	Ford
	1	Truck	1½ ton	Co. Business	General Motors
Railway Express Agency	858	Truck	.....	.....	.....
	64	Tractor	.....	.....	.....
	78	Trailer	.....	.....	.....
St. Louis Southwestern					
Southwestern Transportation Company	14	Truck	1½-2 ton	Rev.	Chevrolet
	8	Truck	1½-2 ton	Rev.	Ford
	6	Truck	1½-3 ton	Rev.	Dodge
	2	Truck	1½-3 ton	Rev.	Int. Harvester
	12	Tractor	3-4 ton	Rev.	White
	10	Tractor	3-4 ton	Rev.	General Motors
	9	Tractor	3-4 ton	Rev.	Int. Harvester
	10	Trailer	5 ton	Rev.	Fruehauf
	2	Automobile	5	Co. Business	Chevrolet
	1	Automobile	5	Co. Business	Dodge
Southwestern Greyhound Lines	35	Bus	36	Rev.	General Motors
	10	Bus	33	Rev.	General Motors
	6	Automobile	5	Co. Business	Chrysler
	1	Automobile	5	Co. Business	General Motors
Seaboard Air Line	2	Truck	1½ ton	Rev.	Ford
	1	Truck	1½ ton	Rev.	Chevrolet
	1	Trailer	2 ton	Rev.	Chevrolet
	6	Automobile	.....	Co. Business	Chevrolet
	3	Automobile	.....	Co. Business	Ford
	1	Automobile	.....	Co. Business	Packard
	1	Automobile	.....	Co. Business	Hudson
	1	Automobile	.....	Co. Business	Plymouth
Southern	2	Bus	21	Co. Business	Chevrolet
	2	Truck	1½ ton	Co. Business	Chevrolet
Southern Pacific	3	Bus	25	Rev.	.....
	8	Truck	1½ ton	Co. Business	.....
	2	Truck	½ ton	Co. Business	.....

Purchaser	No.	Type of Vehicle	Seating capacity or truck capacity in tons	Where to be used	Manufacturer
Southern Pacific—(continued)	1	Truck	¾ ton	Co. Business	.....
	6	Automobile	5	Co. Business	.....
	2	Automobile	2	Co. Business	.....
Pacific Motor Trucking Company	5	Truck	1½ ton	Rev.	.....
	4	Truck	2-3 ton	Rev.	.....
	1	Truck	½ ton	Rev.	.....
	1	Truck	5-7 ton	Rev.	.....
	8	Tractor	3½-5 ton	Rev.	.....
	1	Tractor	2-3 ton	Rev.	.....
	18	Trailer	5 ton	Rev.	.....
	5	Trailer	.....	Rev.	.....
Pacific Greyhound Lines, Inc.	50	Bus	37	Rev.	General Motors
	18	Bus	33	Rev.	General Motors
	7	Automobile	5	Co. Business	Ford
	3	Automobile	5	Co. Business	Plymouth
	1	Automobile	5	Co. Business	Chevrolet
	1	Automobile	5	Co. Business	Pontiac
Texas & New Orleans	2	Bus	.....	Co. Business	Ford
	2	Truck	1½ ton	Co. Business	Chevrolet
	2	Tractor	1½ ton	Co. Business	Chevrolet
	2	Trailer	.....	Co. Business	Stewart & Stevenson
	1	Automobile	2	Co. Business	Ford
Southern Pacific Transport Company of Louisiana	1	Automobile	5	Co. Business	Ford
Southern Pacific Transport Company	7	Truck	1½ ton	Rev.	Chevrolet
	2	Truck	1½ ton	Rev.	Ford
	1	Trailer	3½ ton	Rev.	Nabors
	1	Automobile	2	Co. Business	Chevrolet
	1	Automobile	2	Co. Business	Dodge
Union Pacific Interstate Transit Lines	25	Bus	33	Rev.	General Motors
	5	Bus	36	Rev.	General Motors
	5	Automobile	5	Co. Business	Ford
Union Pacific Stages	6	Bus	21	Rev.	General Motors
Utah Parks Company	1	Truck	1½ ton	Co. Business	Ford
	1	Truck	1½ ton	Co. Business	Chevrolet
	8	Automobile	7	Rev.	Cadillac
	1	Automobile	5	Co. Business	Ford
	1	Automobile	5	Co. Business	Chevrolet
Utah Railway Company	1	Bus-Truck	.....	Co. Business	.....
Waterloo, Cedar Falls & Northern	12	Bus	21	Rev.	General Motors
	6	Bus	27	Rev.	Dittmar Mfg. Co.
	1	Bus	23	Rev.	White
Western Maryland	1	Truck	1½ ton	Co. Business	Ford
Wheeling & Lake Erie	1	Truck	3 ton	Co. Business	General Motors

Mexican Roads Experience Another Gain in Traffic

(*Continued from page 37*)

$237.97 to $271.74 (14.2 per cent); while the cost of material decreased from $155.93 to $134.68 (13.7 per cent), with the result that the total cost increased from $393.90 to $406.42 (3.1 per cent). The cost of coach repairs increased from $27.66 to $36.97 (33.7 per cent) per 1,000 kilometers run, labor having increased from $14.34 to $20.17 (40.7 per cent) and material from $13.32 to $16.80 (26.1 per cent). Car repairs increased from $12.22 to $13.94 (14.1 per cent) for labor, while the cost of material decreased from $17.42 to $14.44 (17.1 per cent), with the result that the total cost decreased from $29.64 to $28.38 (4.3 per cent).

Construction Activities

Aided by a rather liberal attitude toward additions and betterments, construction work on the National of Mexico, both in progress and under contemplation, attained a relatively high degree of activity during the year. Among the major projects under way were the "temporary" Buenavista passenger station in Mexico, D. F., a new passenger station at Tampico, Tam., and an employees' hospital at Mexico, D. F. At Buenavista the facilities now under construction include a two-story office building, embodying passenger station facilities, a Pullman building and various smaller structures. Because of the advantageous location of the Buenavista station with respect to the shops and enginehouse at Nonoalco, it is planned to concentrate operations at that station and to discontinue service at the Colonia station, the site of which is to be converted into either a real estate development or a public park. The temporary facilities at Buenavista have been so designed and arranged that they can be incorporated in a permanent station if it is decided eventually to build one at that location.

The hospital, which was completed during the year, is a modern five-story structure having 200 rooms and space for 400 beds if that many should become necessary. Among the noteworthy features embodied in this structure, which is air-conditioned throughout, are its individual water pumping system, an operating room on each floor, elevators serving all floors, solariums, "magic eye" doors, and a laboratory where medical preparations are compounded.

During the year progress was reported on the location and construction of a number of new lines, this work being carried on under the direct supervision of the Department of Communications and Public Works. Among these is a line which, if present plans are fulfilled, will eventually extend from a connection with the Southern Pacific of Mexico in Southern California to a connection with the same road at Santa Ana, Son.; thereby affording an all-Mexican connection between Southern California and the remainder of the country. Approximately 100 kilometers of this line have now been located.

Another new line on which work was prosecuted during the year is that between Ixcaquixtla, Pue., and Chacahua, Oax., on the Pacific Coast. Up to the end of September $600,000 had been expended on this line, 97 kilometers of line having been located and rails laid on 600 meters. Twelve kilometers of grading, masonry work and track laying have also been completed on a new line between Caltzonzin and Zihuatanejo, of which line 60 kilometers have been located.

Motive power and rolling stock acquired during the year by the National of Mexico include five new narrow-gage locomotives for service on the Interoceanic, 40 standard-gage, all-steel, first-class coaches, 350 box cars and 10 express cars. Considerable new shop machinery was also purchased, a number of yards were enlarged and a large amount of rail was changed out.

NEWS

1.2 Per Cent Drop in Car Loadings

Week ended December 19 below the previous week but 21.5 per cent above 1935

Revenue freight car loading for the week ended December 19 totaled 729,696 cars, a decrease of 9,051 cars or 1.2 per cent below the preceding week, but an increase of 129,030 cars or 21.5 per cent compared with the corresponding week in 1935, and 193,404 cars or 36.1 per cent above the corresponding week in 1930. All commodity classifications except forest products and ore showed decreases under the preceding week's figures but all showed increases over last year. The summary, as compiled by the Car Service Division, Association of American Railroads, follows:

Revenue Freight Car Loading

For Week Ended Saturday, December 19

Districts	1936	1935	1934
Eastern	162,981	134,984	126,109
Allegheny	148,602	114,348	106,998
Pocahontas	53,954	43,672	41,662
Southern	107,930	91,599	82,772
Northwestern ..	83,359	69,985	63,579
Central Western	111,521	91,479	81,316
Southwestern ..	61,349	54,599	46,042
Total Western Roads	256,229	216,063	190,937
Total All Roads	729,696	600,666	548,478
Commodities			
Grain and Grain Products	33,807	29,024	24,855
Live Stock	14,767	12,081	15,569
Coal	162,439	134,405	139,618
Coke	11,200	7,900	6,082
Forest Products	35,731	29,586	20,009
Ore	9,201	7,443	3,282
Merchandise L.C.L.	164,114	151,251	151,073
Miscellaneous ..	298,437	228,976	187,990
December 19 ..	729,696	600,666	548,478
December 12 ..	738,747	616,650	580,202
December 5 ..	744,957	638,518	551,485
November 28 ..	679,984	571,878	488,185
November 21 ..	789,500	647,924	561,942
Cumulative Total, 51 Weeks ..	35,501,089	31,037,446	30,420,556

Loadings in Canada.—In the December 19 week carloadings in Canada totaled 48,279, as compared with 49,710 in the preceding week and 41,650 in the comparable week of 1935, according to the summary of the Dominion Bureau of Statistics. The cumulative total for the year reached 2,442,248, as compared with 2,321,147 in 1935.

Conferences to Be Held on Management-Labor Problems

A series of conferences between representatives of the Association of American Railroads and of the Railway Labor Executives' Association has been planned for the near future for discussion of various management-labor problems. An effort will be made to formulate methods for better co-operation between the managements and the labor organizations which, it is hoped, might tend to reduce the number of occasions on which labor would resort to Congress for legislation to achieve its objectives. Discussion is also planned of a possible agreement between the railroads and the labor organizations on a pension plan, in view of the conflicts between the present plans of the railroads, the present law, which is in litigation, and the social security act. Representatives of the two associations held one such conference on December 18.

$50,000,000 For Grade Crossing Work

The Secretary of Agriculture on December 29 apportioned to the various states $50,000,000 for the elimination of hazards at railroad-highway grade crossings for the fiscal year beginning July 1.

First Motor Certificate Issued by I.C.C.

The first certificate to be issued by the Interstate Commerce Commission, authorizing common carrier operations by motor truck under the "grandfather clause" of the motor carrier act by reason of operations conducted before the law was enacted, was issued last week to the Rodgers Motor Lines, of Scranton, Pa., and was handed personally by Commissioner Eastman to Ted V. Rodgers, president of the American Trucking Associations, Inc., and president of the Scranton company. Approximately 80,000 applications for such certificates and permits had been filed with the commission and some had already been authorized pending compliance with the insurance requirements of the commission.

Traveling Watchmen for Crossings

The Public Service Commission of Pennsylvania, acting on a request from the Pennsylvania, has approved the discontinuance of regular watchmen and gate operators at certain crossings in New Castle, and issued an order approving the road's plan for the employment of a traveling watchman (accompanying switching movements) for five crossings, supplemented by flagging by train crews, where necessary. The number of trains over these crossings has been reduced, passenger train service being wholly discontinued.

A similar application of the Pittsburgh & Lake Erie for two streets in the same city has been approved. The commission requires that all engines or cars be stopped before passing over these two crossings and the speed must be not above four miles an hour. In some cases trainmen are to operate gates.

Reports Show Rise in November Net

Figure of $65,906,297 compares with $48,979,493 in same month of 1935

Advance reports from 101 Class I railroads, representing 91 per cent of total operating revenues, made public on December 28 by the Association of American Railroads, show that those roads in November had a net railway operating income of $65,906,297, compared with $48,979,493 in the same month of 1935. Operating revenues of the 101 railroads in November totaled $326,608,056, compared with $274,282,559 in November, 1935, or an increase of 19.1 per cent. Operating expenses totaled $226,269,857, compared with $199,476,839 in November, 1935, or an increase of 13.4 per cent. Taxes paid in November by these railroads amounted to $24,375,204, compared with $16,464,826 in November, 1935, or an increase of 48 per cent.

Forty-nine Class I railroads in the Eastern district, representing 97.2 per cent of total operating revenues, had a net railway operating income in November of $38,002,692, compared with $29,636,062 in November, 1935. Nineteen Class I railroads, representing 72.9 per cent of the total revenues in the Southern district, had a net railway operating income of $6,507,757 in November, compared with $3,376,900 in the same month of 1935, while 33 Class I railroads, representing 88.7 per cent of the total revenues in the Western district, had a net railway operating income of $21,395,848 in November compared with $15,966,531 in November, 1935.

Government Railroad Financing Suggested by Senator Wheeler

Exclusive financing of railroads by a federal financing agency has been suggested by Chairman Wheeler, of the Senate committee on interstate commerce, as a possible means of removing so-called "banker control" as an alternative to complete government ownership. Discussing the evidence so far developed in the committee's investigation of railroad finance, which so far as public hearings are concerned has been devoted to the affairs of the Van Sweringen companies, Senator Wheeler contended that it had been shown that these properties were under control of a banker group and that it would be difficult to remove this control, short of government ownership, except by such a plan as that suggested. Hearings in connection with the investigation are to be resumed on January 6.

Continued on third right-hand page

Christmas Travel Best Since 1929

Heavy holiday traffic in East and West, with increases up to 40 per cent over 1935

The heaviest movement of holiday passenger traffic since 1929 was handled by the railways during the Christmas holidays. This business, which exceeded that of last year by as much as 40 per cent, began to move as early as December 15 and reached its peak on December 23.

On the Pennsylvania the Western Region alone operated more than 300 extra sections during the period from December 15 to 24, inclusive. Express and mail traffic likewise was heavier than last year, mail shipments out of Chicago on the Pennsylvania being 14 per cent greater than in the same period in 1929.

The Atchison, Topeka & Santa Fe operated its Chief to Los Angeles, and its Ranger to Texas, in two sections on each day from December 18 to 23, and its Scout to Kansas City in two sections on December 18 and 19.

The New York Central, from December 17 to December 24, inclusive, operated a total of 250 extra trains in and out of Chicago. The North Western, from December 15 to 24, inclusive, operated 53 extra sections and 139 extra sleeping cars. As early as December 18 the traffic was so heavy that 12 extra sections were required. On December 28 the "400" was operated in four sections, while the Chicago-Green Bay train required three sections.

The Baltimore & Ohio's traffic this year likewise was greater than last year, and necessitated the operation of the Capitol Limited out of Washington in three sections on several days, including December 18, 22 and 23. The traffic from Chicago to St. Louis on the Alton required the operation of two extra sections of two afternoon trains on December 24.

The Chicago, Rock Island & Pacific, from December 16 to 24, operated a total of 224 extra coaches and 85 pullman cars. California business during this period was approximately 27 per cent heavier than last year, resulting in the operation of the Golden State Limited in two sections for two weeks. The Rock Island's express business prior to Christmas was so heavy that it was necessary to handle much of it in refrigerator cars.

In the East, despite mild weather which tended to keep many automobilists on the highways, the railroads handled over the Christmas holidays a volume of passenger business which perhaps broke records of many years standing. While no definite figures or comparisons were available early this week, passenger traffic officers there were describing the holiday travel as "exceptionally good," "tremendous" and "magnificent."

All-time records for the number of passengers into and out of Grand Central terminal and Pennsylvania station, New York, will perhaps be shown to have been broken when complete figures are compiled. Out of the former, the New York Central operated about 170 extra trains between December 17 and 28 while the New York, New Haven & Hartford handled a record-breaking number of travelers to and from New England. At Pennsylvania station, between December 16 and 24, the Pennsylvania operated approximately 480 extra trains—300 outbound and 180 inbound. Including these and extra cars on regular trains it operated 5,600 extra cars.

The Baltimore & Ohio's business out of New York recorded "a big increase" over the 1935 Christmas business, being the biggest in eight or nine years. This road operated several extra trains as well as extra sections on regular trains. The Central of New Jersey reported an increase of 15 per cent in passenger revenue as compared with the 1935 holiday business. It operated extra sections of all through trains and added cars to all of its trains.

The Delaware, Lackawanna & Western handled the largest volume in years, amounting to double the volume handled during the 1935 Christmas period. On December 24 it had 88 extra coaches in service. The peak of travel over this road was expected to come Sunday, January 3, when students will be returning to college after their Christmas vacations. On that day the Lackawanna will operate out of New York five special trains for the students—three for Cornell students, and one each for those returning to Colgate and Syracuse University.

The Lehigh Valley's Christmas business was greatly in excess of that in 1935. All of its trains were operated in two or three sections, with each filled out to the maximum number of cars. This road also expects its biggest day on Sunday, January 3, when it, too, will be carrying students back to colleges along its lines.

I.C.C. To Determine Washington, D. C., Commercial Zone

The Interstate Commerce Commission has ordered a proceeding of investigation for the purpose of determining the area and extent of the municipality of Washington, D. C., and of the zone adjacent to and commercially a part of it, for the purposes of Section 203 of the motor carrier act, which exempts motor carrier operations in such zones to some features of the commission's regulation. The subject has been assigned for hearing at Washington on January 21 before Examiner Paul Coyle.

Railroad Labor's Legislative Program

Legislation providing for a plan of unemployment insurance for railroad employees, separate from the general plan now included in the social security act, was added to the program to be urged by the railroad labor organizations at the coming session of Congress, at a meeting of the Railway Labor Executives' Association last week in Washington. Other bills on their program are the six-hour day, full crew, train limit, track and bridge inspection, signal inspection, and train despatchers' bills, and amendments to the hours of service and federal employers' liability acts.

Greyhound Stock Dividend Allowed

I. C. C. largely influenced by effects of revenue act of 1936 in authorizing disbursement

Indicating that it was largely influenced by the effect of the revenue act of 1936, which penalizes a corporation for failure to distribute its earnings, Division 5 of the Interstate Commerce Commission on December 28 authorized the Greyhound Corporation to issue $1,950,900 of 5½ per cent preference stock to provide for an extra dividend to owners of its common stock out of the net earnings of the current year. The report said that the commission had authorized railroads to issue stock dividends but that in all instances the stock so issued had been common stock, although Division 4 of the commission had recently authorized the Chesapeake & Ohio to issue $15,315,500 of preference stock as a stock dividend.

"Apart from the Revenue Act of 1936," the report said, "it would be difficult to justify the issuance of preferred stock as a dividend, and it does not appear that applicant would seek such authority. Its prior policy of financing additions and betterments largely out of earnings would, moreover, taking all the circumstances into consideration, be consistent with the views which we have heretofore expressed, in regard to the desirability of a substantial uncapitalized surplus providing for emergency needs, offsetting obsolescence and necessary investments in nonrevenue-producing property, and serving as a general financial balance-wheel. However, the Revenue Act makes it impossible to continue this prior policy, except at a severe penalty, and was apparently designed to impel the distribution of a larger proportion of current earnings to the stockholders.

"The question, therefore, is the practical one of determining the course which is compatible with the public interest in these circumstances. The choice is between a course which imposes a severe financial penalty and one which carries with it certain other disadvantages. After careful consideration, our conclusion is that these other disadvantages are of lesser consequence, in the public interest, and that the proposed issue of preference stock should be approved. We are influenced in this conclusion by the fact that this course appears to be in consonance with the present policy of the Congress, and by the further fact that, as we interpret the proposed transaction, the preference stock will in actual effect be issued to finance additions and betterments for the system companies, notwithstanding the form which it takes as a stock dividend."

Two New Sperry Cars

The Sperry Rail Service division of Sperry Products, Inc., is building two new detector cars that will be ready for service early in the spring. Similar to those built in 1935, the new cars will have gas-electric-drive, with the power truck in front and the latest model of detector truck in the rear, but with air-brake control at

both ends of the car. These cars will have a length of 57 ft. and will provide living accommodations for the crew, in addition to the operating and apparatus room. The company is also rebuilding a detector car that was severely damaged by fire last November and this car will also be available for service in the spring.

New York Warehouse Order Again Postponed

The Interstate Commerce Commission has again postponed, from February 1 to April 1, the effective date of its order in Ex Parte No. 104, relating to the warehouse practices of railroads at the port of New York.

Large Rivers and Harbors Expenditures Proposed

The annual report of the chief of engineers to the War Department includes a list of "amounts that can be profitably expended" during the fiscal year 1938 for river and harbor projects, totaling $140,150,150 for new work and $39,716,970 for maintenance.

Eastern Car Foreman's Association

The Eastern Car Foreman's Association will hold its first 1937 meeting on January 8 at 8 P. M. in Room 502 of the Engineering Societies Building, 29 West 39th Street, New York. C. J. Hayes, supervisor, A. A. R. Clearing House, New York Central, Buffalo, N. Y., will speak on "A. A. R. Rules of Interchange."

Miller Elected I.C.C. Chairman

Pursuant to the policy adopted January 13, 1911, Commissioner Carroll Miller has been elected chairman of the Interstate Commerce Commission for the ensuing year, effective January 1. He succeeds the present chairman, Commissioner Charles D. Mahaffie.

The new chairman comes from Pennsylvania. He was born in Richmond, Va., where he received his primary education in private schools. He attended Richmond College preparatory to entering Stevens Institute of Technology, where he graduated with the degree of mechanical engineer.

Mr. Miller was appointed a member of the commission by President Roosevelt in 1933. Prior to his appointment, the largest portion of Mr. Miller's professional life had been devoted to the natural and manufactured gas business and related industries. He had served in various positions from foreman to president and also, for several years, as consulting engineer.

Illinois Miners Blamed for Rail Bombings

A total of 41 men has been indicted, of which 37 have been arrested, by the federal government, in its investigation of the bombings of railroad property in Southern Illinois since 1932. The indictments blamed members of the Progressive Miners of America and charged the men with obstruction of the mails. In addition, 26 were alleged to have violated the federal anti-racketeering law. The defendants were charged with bombing trains to intimidate mines and railroads from transporting in interstate commerce coal not mined by the Progressives. In its investigation of terrorism and property damage, the goverment was aided by the railroads, especially through the co-operation of their police departments. Of the bombings of railroad property in which a number of trains were damaged, 16 were on the Chicago & Illinois Midland, 4 on the Cleveland, Cincinnati, Chicago & St. Louis, 5 on the Chicago, Burlington & Quincy and 5 on the Illinois Central.

9.2 Per Cent Increase in Loadings Estimated for First Quarter

Freight car loadings in the first quarter of 1937 are expected to be about 9.2 per cent above actual loadings in the same quarter in 1936, according to estimates compiled by the 13 Shippers' Regional Advisory Boards. On the basis of these estimates, freight car loadings of the 29 principal commodities would be 5,307,026 cars in the first quarter of 1937, compared with 4,859,593 actual loadings for the same commodities in the corresponding period in 1936.

Each of the 13 Shippers' Regional Advisory Boards, except those for the Central Western and the Northwest Regions, estimates an increase in the loadings for the first quarter of 1937 compared with the same period in 1936. The tabulation below shows the total loading for each district for the first quarter of 1936, the estimated loadings for the first quarter of 1937, and the percentage of increase.

Shippers' Advisory Boards	Actual Loadings 1936	Estimated Loadings 1937	Per Cent Increase
Allegheny	741,429	842,363	13.6
Pacific Coast	173,659	190,790	9.9
Pacific Northwest	152,020	181,898	19.7
Southeast	477,366	522,981	9.6
Southwest	297,271	309,943	4.3
Great Lakes	296,213	373,576	26.1
Atlantic States	565,656	619,779	9.6
Central Western	203,585	200,011	1.8*
New England	117,764	124,125	5.4
Northwest	156,865	140,813	10.2*
Mid-West	735,569	802,593	9.1
Ohio Valley	656,225	695,933	6.1
Trans-Missouri-Kansas	285,971	302,221	5.7
Total	4,859,593	5,307,026	9.2

* Decrease.

Advanced Rate Hearings to Begin January 6

Hearings on the readjustment of freight rates, proposed by the railroads as a substitute for the emergency surcharges which expired on December 31, will begin on January 6 before Commissioner Aitchison of the Interstate Commerce Commission and will continue until about January 15 or 16, when an adjournment will be taken for about 10 days on account of the inauguration. This information was contained in a letter from Commissioner Aitchison to A. F. Cleveland, vice-president of the Association of American Railroads, on December 24.

After the railroads have presented their evidence of a general nature, they will offer evidence relating to the following individual commodities and groups of commodities: Coal and coke, iron ore, chrome ore and concentrates, manganese ore and concentrates, iron and steel, scrap iron and steel and articles related thereto, pyrites, blades and cutting edges, baffles, absorber towers and parts, ferro-alloys, cesspools, chains, cement, natural, hydraulic or portland, and cement and concrete articles.

Rail Purchase Policy Established

Exercising authority given by the circuit court of appeals at St. Louis, Mo., the federal district court, on December 22, entered an order directing Berryman Henwood, trustee for the St. Louis-Southwestern, to proceed immediately to purchase, with cash, 5 locomotives and 10 passenger cars. The trustee was instructed by the court to reserve special title in Henwood's name, so that if the courts eventually hold that the equipment must be financed through equipment trust certificates, the railroad's trustee could transfer good title to the trustees of the equipment trust issue.

Previously District Judge Charles D. Davis placed the railroad on a "cash and carry" basis, in purchasing $1,050,000 of new locomotives and air-conditioned passenger coaches. Counsel for the trustees of the road argued that the ruling was not only unfair to bondholders who were not receiving full interest payments but, if allowed to stand, would constitute a serious threat to prevailing methods of railroad financing. They argued that current earnings should be used to pay bond interest and purchases should be made with the equipment trust certificates. On December 18 the United States circuit court of appeals took under advisement the application for an appeal from the lower court ruling. Appeal from this action will be heard before the Appellate court on February 1.

Increases in Transcontinental Freight Rates Allowed

Increases in transcontinental freight rates by amounts closely approximating the emergency charges which expired by limitation on December 31 were allowed to become effective on December 24 after the Interstate Commerce Commission had declined to suspend them in spite of many protests from shippers. The rates were published in tariffs filed by Agent L. E. Kipp. Similar proposals made by other western railroads were suspended by the commission on December 23.

In reply to petitions for suspension of the transcontinental tariffs the railroads pointed out that more than 4,000 reductions in transcontinental rates had been made on account of water competition through the Panama canal and via the rivers and that by reason of such competitive reductions the rate structure had been depressed considerably below maximum rates prescribed by the commission. In addition to their desire to prevent reduction in revenues on the expiration of the surcharges the railroads also said they were trying to preserve an agreement made with the intercoastal carriers in October, 1935, that they would make an effort to add the emergency charges to the permanent rate structure.

The tariffs that were suspended, affecting particularly rates in the Mountain-Pacific territory, will come before the commission again in connection with the hearings in Ex Parte No. 115, to begin on January 6.

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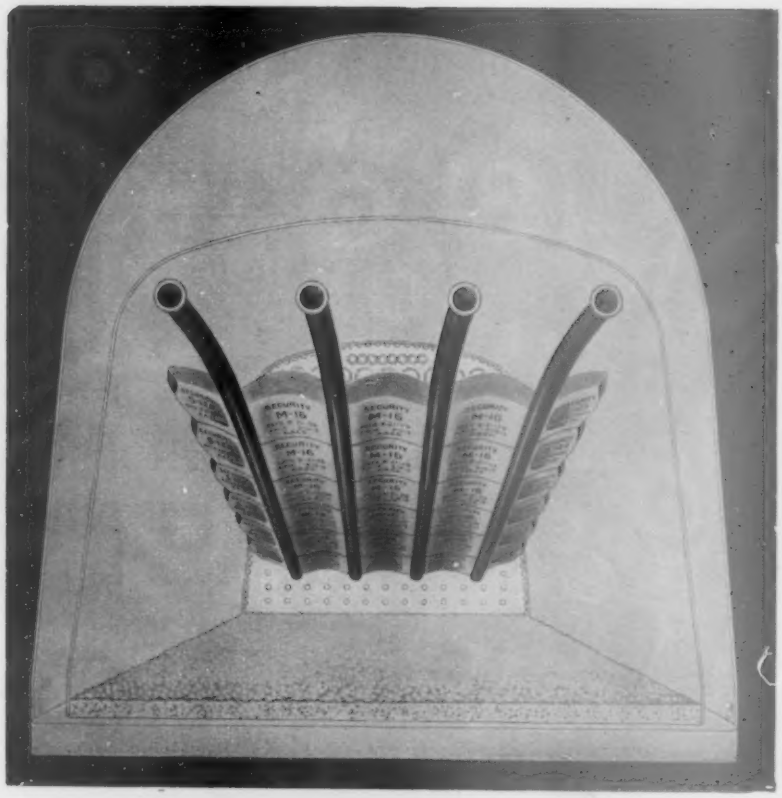

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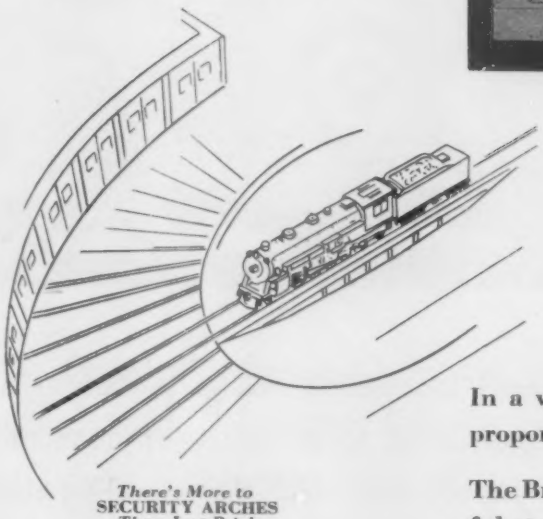

There's More to
SECURITY ARCHES
Than Just Brick

. . . WHAT THE BRICK ARCH DOES IN THE FIREBOX

In a well-designed arch there is a definite, well-determined proportion between firebox size and brick arch length.

The Brick Arch design is the result of long experience and careful study on the part of American Arch Company engineers.

It is determined by the need for mixing the gases of combustion and the need for compelling the fines to burn before they reach the flues.

Anything less than a complete arch, and economy suffers seriously.

Be sure the brick arch is properly designed and be sure it is completely maintained.

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

AMERICAN ARCH CO.
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Locomotive Combustion Specialists

MODERN RAILROADING requires modern power!

In a properly co-ordinated locomotive design the boiler and main cylinders are proportioned to produce, at economical coal rates, the maximum horsepower which the operating conditions demand.

To meet the tractive power requirements below the maximum horsepower range and to utilize as much of the potential boiler horsepower as possible, the Locomotive Booster is incorporated as a component part of the locomotive; providing maximum starting effort and rapid acceleration, as well as that reserve power so

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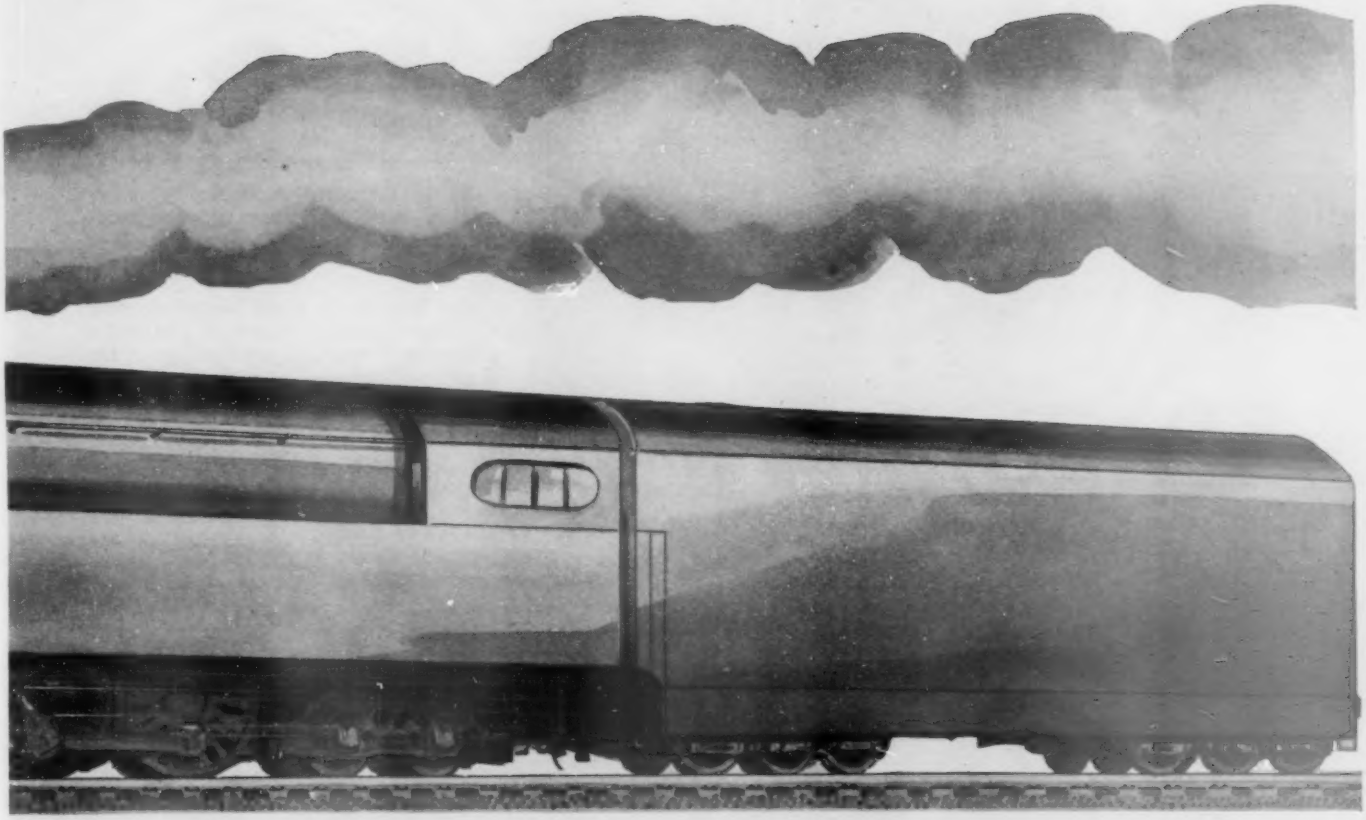
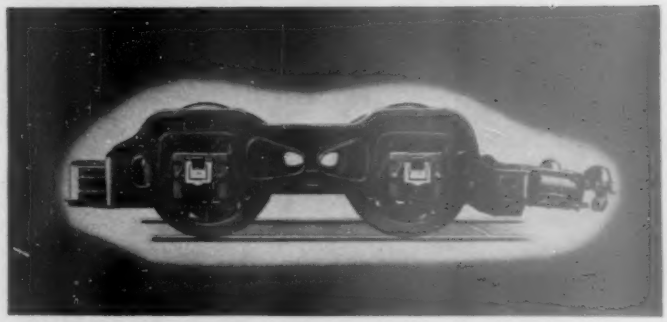
FRANKLIN RAILWAY

NEW YORK



essential in meeting the close schedules imposed by modern railroad operation. This balanced design insures main cylinder dimensions no larger than required to utilize the maximum boiler output at most efficient steam rates. Thus economy of cylinder performance and maintenance cost is not sacrificed, as is the case where cylinders are designed for maximum starting power only.



SUPPLY COMPANY, INC.

CHICAGO MONTREAL

Equipment and Supplies

M. P. Authorized to Spend $8,552,302

The Missouri Pacific on December 28 was granted permission by the Federal District Court at St. Louis to spend $8,552,302 for additions and betterments.

Included will be: $2,671,470 for 33,950 tons of rails, fastenings and labor ordered in December; $559,000 for 235 miles of automatic block signals between McCracken, Kan., and Sugar City, Col.; $52,000 for additional automatic block signals between Poplar Bluff, Mo., and Harviell; $114,000 for an engine house at Atchison, Kan.; $125,870 for a 12-stall extension to the engine house at Kansas City, Mo.; $67,500 for a 9-stall extension to the roundhouse at Omaha, Neb.; $103,800 for improvements to the power plant at the shops at North Little Rock, Ark.; and the balance for equipment, air conditioning, modernizing cars and miscellaneous expense incident to operation of the property.

C. & N. W. to Spend $6,307,500 for Equipment

The Chicago & North Western on December 29, was authorized by the federal district court at Chicago to purchase $6,307,500 of new equipment as follows: $1,000,000 for eight streamlined passenger locomotives with 84-in. driving wheels, two for use on the "Four Hundred" and six for use on through trains between Chicago and Omaha; $1,385,000 for 23 "Challenger"-type coaches of which 10 will be used on the Chicago-Los Angeles "Challenger" and 13 on two new "Challengers" which will be placed in service between Chicago and San Francisco, and Chicago and Portland about June 1; $1,540,000 for 500 seventy-ton hopper cars; $2,000,000 for 500 fifty-ton automobile cars; and $382,500 for 150 seventy-ton ballast cars. Inquiries will be issued soon for the locomotives and ballast cars, while those for hopper and automobile cars and coaches were reported in the *Railway Age* of November 28 and December 12.

Burlington $8,861,300 Equipment-Building Program

The Chicago, Burlington & Quincy, on December 23, applied to the Interstate Commerce Commission for authority to issue $7,080,000 of two per cent equipment trust certificates, to be sold in connection with the construction of new equipment at a total estimated cost of $8,861,300. The equipment, to be constructed in the railroad's shops, is as follows: Ten 4-8-4 type locomotives; 1,000 fifty-ton steel frame box cars; 250 steel frame automobile cars; 250 all-steel hopper cars; 1,500 gondola cars; 100 flat cars; and 150 steel frame stock cars.

Equipment to be constructed in the shops of the Refrigerator Express Company, a Burlington subsidiary, are 300 refrigerator cars. Inquiry for this equipment was reported in the *Railway Age* of October 31.

LOCOMOTIVES

The Pere Marquette is inquiring for 15 locomotives of the 2-8-4 type and a number of extra tenders.

The Western Pacific has ordered seven 4-6-6-4 type locomotives from the American Locomotive Company and four of the 2-8-8-2 type from the Baldwin Locomotive Works. Inquiry for this equipment was reported in the *Railway Age* of November 14.

FREIGHT CARS

The Louisville & Nashville is inquiring for 3,000 hopper cars.

The Great Northern is inquiring for 1,000 fifty-ton box cars and 500 fifty-ton gondola cars.

The Missouri-Kansas-Texas will soon issue inquiries for 500 forty-ton gondola cars, 250 automobile cars and 500 stock cars.

New York, New Haven & Hartford, reported in the *Railway Age* of December 12 as contemplating the purchase of 75 flat cars, will build this equipment in its own shops.

The Chesapeake & Ohio has ordered 50 caboose cars from the Magor Car Corporation. Inquiry for this equipment was reported in the *Railway Age* of December 5.

The Duluth, Missabe & Northern has ordered 50 hopper cars from the Ryan Car Company. Inquiry for this equipment was reported in the *Railway Age* of November 21.

The General Chemical Company has ordered from the General American Transportation Corporation 140 tank cars, including 97 of 50 tons capacity, 28 of 70 tons capacity and 15 of 40 tons capacity.

The Illinois Central is inquiring for 3,100 freight cars, including: One thousand 40-ft., 6-in., and eight hundred 50-ft., 6-in., box cars; one thousand 50-ton hopper cars; and three hundred 40-ft., 40-ton refrigerator cars.

The Elgin, Joliet & Eastern has ordered 1050 freight cars, including 200 hopper cars of 50 tons' capacity, 750 gondola cars of 50 tons' capacity and 100 gondola cars 65 ft. long of 70 tons' capacity, from the Mt. Vernon Car Manufacturing Company.

PASSENGER CARS

The Illinois Central is inquiring for 20 baggage-storage cars.

The Great Northern is inquiring for 12 coaches.

The Missouri-Kansas-Texas will soon issue inquiries for three dining cars, 25 chair cars and one lounge car.

The Richmond, Fredericksburg & Potomac has ordered six baggage and express cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of December 12.

IRON AND STEEL

The St. Louis-San Francisco has ordered 13,500 tons of rail from the Tennessee Coal, Iron & Railroad Company.

Supply Trade

R. B. Howland, assistant to the president of **United Engineers & Constructors, Inc.,** Philadelphia, Pa., has been elected vice-president and a director.

The **Edward G. Budd Manufacturing Company,** railway division, has opened a mid-western sales and service office in the Railway Exchange building, Chicago. Thomas H. Henkle, western sales manager is in charge of the office.

Benjamin F. Affleck, who retired as president of the **Universal Atlas Cement Company** on September 1, was made an honorary life member of the Portland Cement Association at a dinner given in his honor at Chicago on December 16.

The Worthington Pump & Machinery Corporation, Harrison, N. J., on January 1, absorbed its subsidiary, the **Carbondale Machine Corporation.** Carbondale organization products, and sales activities, will be continued as a division of Worthington.

Upon the affirmative approval of approximately 95 per cent of all the creditors of the **Roberts & Schaefer Company,** Chicago, the United States District Court in that city approved the plan of reorganization of this company on December 22.

A. C. Wilby, assistant to the president of the **Universal Atlas Cement Company,** and **William Voigt, Jr.,** have been appointed managers of public relations of the **Carnegie-Illinois Steel Company,** with headquarters at Chicago and Pittsburgh, Pa., respectively.

George W. Bender has been appointed sales representative of the **Equipment Specialties Division** of the **Union Asbestos & Rubber Company,** Chicago, with headquarters at St. Paul, Minn., and the **Howat Equipment Company,** Grant building, Pittsburgh, Pa., has been appointed sales representative in Pittsburgh and other eastern territory.

The White Motor Company has added to its truck line by entering the low-priced field with its 1937 models. The new Whites are to be streamlined and will afford a truck to fit any need. The new trucks will provide a choice in transmissions, rear axle ratios, and tire sizes to meet the requirements of specific operations. A feature of the new series is a

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ELESCO

New 2-10-4 Type Locomotives for the Bessemer & Lake Erie Railroad

Equipped with

ELESCO Type "E" Superheaters
ELESCO Exhaust Steam Injectors
ELESCO Tangential Steam Dryers
ELESCO Superheated Steam Pyrometers
AMERICAN Multiple Throttles

White six-cylinder engine of 250 cu. in. displacement, having light-weight pistons and a water-cooling system for the valve seats. The new trucks offer a choice of five wheelbases, from 136 to 196 in., while the tractors are supplied in two wheelbases, 136 and 148 in.

Edward Clarke Felton, assistant treasurer of the **Hunt-Spiller Manufacturing Corporation,** Boston, Mass., has been elected vice-president, succeeding the late F. M. Weymouth. Mr. Felton was born at East Boston, Mass., on June 6, 1883. He was graduated from the Boston public schools, and Commercial College. From

Edward C. Felton

1912 to 1918 he was employed by the General Motors Truck Company as branch accountant and became associated with the Hunt-Spiller Manufacturing Corporation in July, 1918, as assistant to vice-president. In April, 1928, Mr. Felton was appointed assistant treasurer which position he held at the time of his election as vice-president.

TRADE PUBLICATIONS

ROOFING.—The Johns-Manville Corporation, New York, has published a 26-page booklet entitled "Things You Should Know about Your Roof." This booklet, which deals exclusively with industrial roofs, discusses and illustrates how roofing felts should be laid, how flashing should be applied, how joints in the coping should be protected, and how roofing should be placed around drains, skylights and angle supports. In addition, it points out the advantages of insulating certain types of roof decks when heating economy is a factor or condensation a problem.

ALUMINUM PAINT.—Aluminum Industries, Inc., Cincinnati, Ohio, has issued a booklet of 60 pages, 8½ in. by 11 in., descriptive of the properties and advantages of Permite ready-mixed aluminum paint. The text is divided among such topical headings as the characteristics and manufacturing processes, the results of exposure tests, scope of uses, testimonials, and the physical properties of 10 types of Permite paint for various uses. The book is profusely illustrated and attractively embellished through the effective use of aluminum ink.

Financial

CHICAGO, BURLINGTON & QUINCY.—*Equipment Trust Certificates.*—This company has asked the Interstate Commerce Commission for authority to assume obligation and liability in respect of $7,080,000 of 2 per cent equipment trust certificates.

GREAT NORTHERN.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $50,000,000 of general mortgage 3¾ per cent bonds due January, 1967, the proceeds to be used in connection with a program of refunding $60,000,000 of outstanding bonds.

KANSAS CITY SOUTHERN.—*Equipment Trust Certificates.*—The Interstate Commerce Commission, Division 4, has authorized this company to assume obligation and liability in respect of $3,195,000 of 3 per cent equipment trust certificates, to be issued by the Guaranty Trust Company of New York, as trustee; the first six maturing installments thereof, of an aggregate par value of $1,278,000 to be sold at 105.0851 and accrued dividends, and the last nine maturing installments, of an aggregate par value of $1,917,000, to be sold to the Bankers Trust Company of New York, as trustee under the company's first mortgage and deed of trust dated April 2, 1900, at par and accrued dividends.

PENNSYLVANIA.—*Stock.*—The Pennsylvania Railroad Company has petitioned the Interstate Commerce Commission for authority to sell to the Pennsylvania 150,000 shares of Cleveland & Pittsburgh 4 per cent special guaranteed betterment stock of an aggregate par value of $7,500,000 at $50 a share.

ST. LOUIS SOUTHWESTERN.—*Reorganization.*—The Interstate Commerce Commission has assigned the reorganization plan proposed by the debtor for hearing before Examiners R. T. Boyden and J. V. Walsh at Washington on March 16.

UNION RAILROAD.—*Merger.*—The Interstate Commerce Commission, Division 4, has authorized the merger of the properties of the Union Railroad, the Monongahela Southern, and the St. Clair Terminal Railroad into one corporation for ownership, management and operation.

Average Prices of Stocks and Bonds

	Dec. 29	Last week	Last year
Average price of 20 representative railway stocks..	52.42	51.50	41.59
Average price of 20 representative railway bonds..	83.53	83.04	76.23

Dividends Declared

Carolina, Clinchfield & Ohio.—$1.00, quarterly; Stamped Certificates, $1.25, both payable January 20 to holders of record January 9.

Norfolk & Western.—Preferred, $1.00, quarterly, payable February 19 to holders of record January 30.

Northern Central.—$2.00, payable January 15 to holders of record December 31.

Piedmont & Northern.—75c, quarterly, payable January 11 to holders of record December 31.

Reading.—50c, quarterly, payable February 11 to holders of record January 14.

Railway Officers

EXECUTIVE

Howard C. Mann, chief engineer of the Union Pacific, has been promoted to vice-president in charge of operations, with headquarters as before at Omaha, Neb. The appointment of Mr. Mann marks the recreation of a position that was abolished in 1932, when William M. Jeffers, then vice-president in charge of operations, was elected executive vice-president. Mr. Mann was born on August 30, 1885, at Missouri Valley, Iowa, and was educated in engineering at the University of Nebraska. He first entered railway service in August, 1907, as a rodman on the Canadian

Howard C. Mann

Pacific, remaining with that company until December, 1908. In April of the following year he entered the service of the Union Pacific as an instrumentman on double-track work, later being advanced to assistant engineer on second-track construction in Nebraska and Wyoming. In January, 1912, Mr. Mann was assigned to valuation work at Omaha, where he remained until the fall of that year when he became engaged on various surveys and on construction work on branch lines in Nebraska, Wyoming and Utah. In October, 1918, Mr. Mann was assigned to special work in the general office with the title of assistant engineer, being appointed engineer accountant in September, 1919. Beginning in April, 1922, he served as resident engineer and assistant engineer in charge of bridge construction on the Oregon-Washington Railroad & Navigation Co. (now the Northwestern district of the U. P.) and in June, 1923, he was placed in charge of the construction of tourist facilities for the railroad in southern Utah. In November, 1924, Mr. Mann was promoted to assistant chief engineer with jurisdiction over the Los Angeles & Salt Lake (now the Southwestern district), with headquarters at Los Angeles, Cal. Since January, 1928, he has been chief engineer of the system. His appoint-

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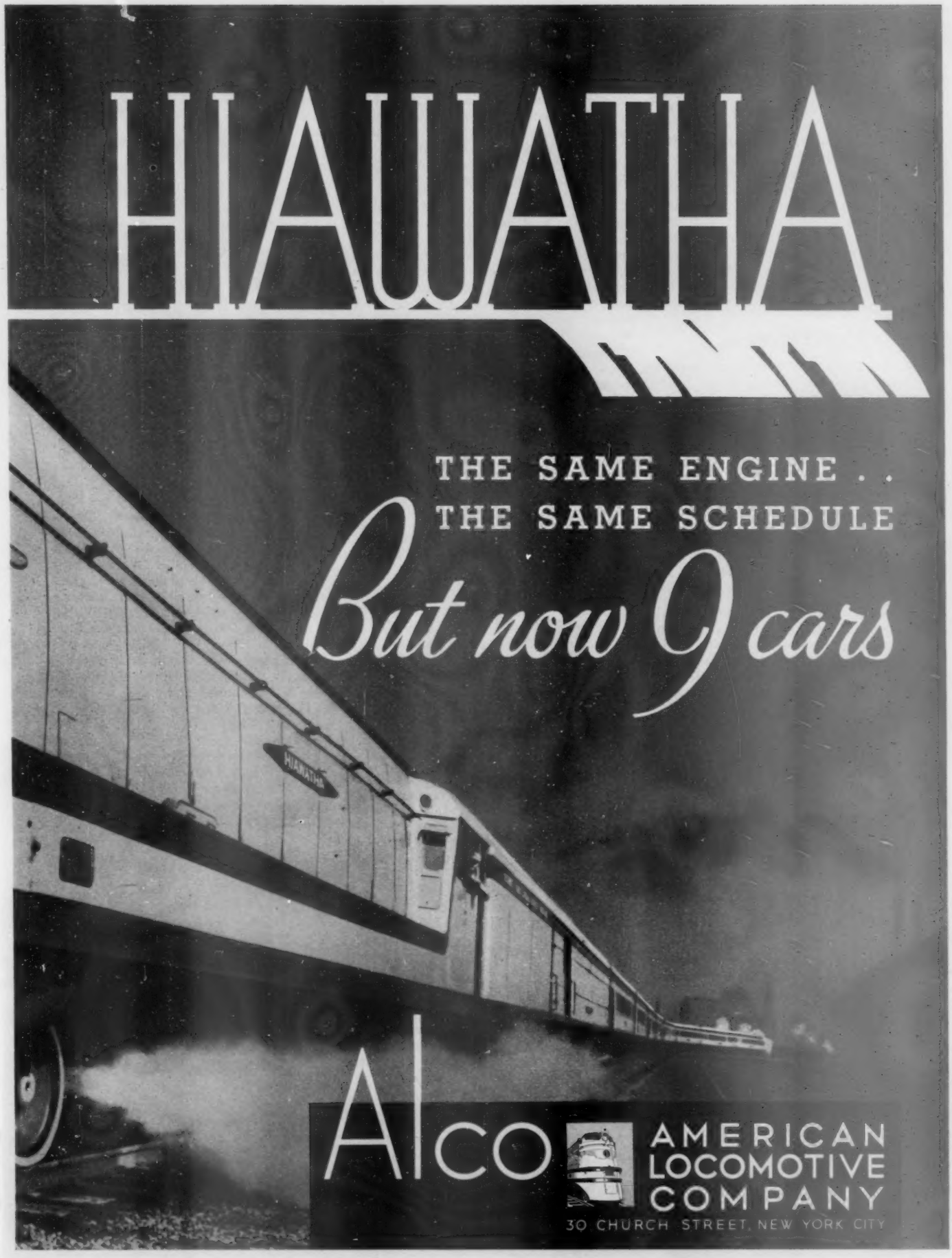

HIAWATHA
THE SAME ENGINE . .
THE SAME SCHEDULE
But now 9 cars
HIAWATHA
Alco
AMERICAN
LOCOMOTIVE
COMPANY
30 CHURCH STREET, NEW YORK CITY

ment as vice-president in charge of operations became effective on January 1.

FINANCIAL, LEGAL AND ACCOUNTING

Thomas H. Maguire has been appointed assistant general attorney for the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Seattle, Wash., to succeed **O. G. Edwards,** who was recently appointed tax commissioner of this company, with headquarters at Milwaukee, Wis. Mr. Maguire has been in general law practice in Seattle since 1934 and was previously associated with the law departments of other western railroads. His appointment as assistant general attorney became effective on January 1.

OPERATING

W. F. Tully, assistant superintendent for the Canadian Pacific, with headquarters at Toronto, Ont., has been appointed superintendent of the Farnham division, with headquarters at Farnham, Que., succeeding **W. E. McGill,** transferred.

R. D. Tobien, assistant to the chief engineer of the Southern, with headquarters at Birmingham, Ala., has been appointed assistant general manager, with the same headquarters, to succeed **L. H. Woodall,** who has been transferred to St. Louis, Mo.

Raymond Durley, assistant general manager of the Alton & Southern has been promoted to general manager, with headquarters as before at East St. Louis, Ill., to succeed **T. H. Pindell,** whose election as president was noted in the *Railway Age* of December 26.

R. C. Dodds, assistant superintendent of the Kansas City Terminal division of the Chicago, Milwaukee, St. Paul & Pacific, has been promoted to superintendent of the Iowa and Southern Minnesota division, with headquarters at Austin, Minn., to succeed **G. A. Van Dyke,** who has retired. **R. A. Woodworth,** trainmaster of the Chicago Terminal division with headquarters at Bensonville, Ill., has been appointed assistant superintendent of the Kansas City Terminal division to succeed Mr. Dodds. **J. M. Calligan,** general yardmaster at Milwaukee, Wis., has been promoted to trainmaster of the Chicago Terminal division to succeed Mr. Woodworth.

TRAFFIC

W. J. Kenealy has been appointed general passenger agent for the Seaboard Air Line, with headquarters at Jacksonville, Fla., succeeding **G. Z. Phillips,** deceased.

Ellsworth Woodward, traffic manager of the Alton & Southern, has been appointed to the newly-created position of general traffic manager with headquarters as before at East St. Louis, Ill.

T. A. Weybrecht, chief of the tariff bureau of the Wheeling & Lake Erie and the Lorain & West Virginia at Cleveland, Ohio, has been promoted to the newly-created position of general freight agent, with the same headquarters.

L. V. Polk, traveling passenger agent on the Gulf, Colorado & Santa Fe, with headquarters at Houston, Tex., has been appointed general traveling passenger agent with headquarters at Galveston, Tex., to succeed **Oscar Nelson,** who has been promoted to division passenger agent, with the same headquarters.

W. W. Finley, Jr., general freight agent of the Pennsylvania, with headquarters at Philadelphia, Pa., has been promoted to freight traffic manager, with headquarters at New York. He will be in general charge of the Pennsylvania's freight traffic interests in the New York metropolitan district and in New England. **W. P. Veit,** general freight agent at Chicago, has been transferred in the same capacity to Philadelphia, as Mr. Finley's successor. Mr. Finley was born in Dallas, Texas, in 1888, and completed his education at the Wharton School of the University of Pennsylvania. He entered railroad service in 1910 as receiving clerk in a Pennsylvania freight station and after traffic experience at various points, was made district freight solicitor at Atlanta, Ga., in 1916. In 1918 he was transferred to Philadelphia and later to Pittsburgh and Chambersburg, Pa. Mr. Finley became general southeastern freight agent at Atlanta in 1924, and general freight agent at Cincinnati in 1927. He was transferred in the latter capacity to Philadelphia in 1931.

W. W. Finley, Jr.

Earl W. Fisher, general coal freight agent on the Pennsylvania, with headquarters at Chicago, has been promoted to general freight agent with the same headquarters, to succeed **William P. Veit. H. H. Lippold,** coal freight agent at Pittsburgh, Pa., has been promoted to general coal freight agent at Chicago, to succeed Mr. Fisher.

Mr. Fisher was born in 1896, at Leesport, Pa., and entered the service of the Pennsylvania in 1914 at Reading, Pa. After being advanced through various positions, Mr. Fisher was appointed coal freight agent at Philadelphia in 1931 and in the following year he was appointed commerce agent. On March 1, 1934, he was further advanced to division freight agent at Cincinnati, Ohio, and on November 16 of the same year he was made general coal freight agent at Chicago, the position he was holding at the time of his recent appointment as general freight agent, effective January 1.

Earl W. Fisher

James C. LaCoste, who has been appointed general freight agent of the Chicago, Rock Island & Pacific at Kansas City, Mo., as reported in the *Railway Age* of December 19, was born on January 19, 1874, at Charleston, S. C. After serving for several years with brokerage and grain firms in Birmingham, Ala., Mr. LaCoste entered railway service on March 15, 1892, as a stenographer with the Kansas City, Memphis & Birmingham. On November 4, 1896, he became rate and tariff clerk at Kansas City for the Kansas City, Ft. Scott & Memphis (identified with the K. C. M. & B.) and on April 1, 1901, he was made chief clerk to the assistant general freight agent of both companies at Memphis, Tenn. On August 1, 1904, he was made chief tariff clerk in the general freight office of the Frisco at St. Louis, Mo., this company having acquired control of the K. C. F. S. & M. and the K. C. M. & B. On July 1, 1907, Mr. LaCoste became division freight agent of the Frisco and commercial agent for the Chicago, Rock Island & Pacific and the Chicago & Eastern Illinois at Birmingham, Ala., these

James C. LaCoste

companies at that time being under common control. On February 1, 1909, he was made chief of the tariff bureau in charge of freight tariff publications of the Rock Island at Chicago, holding this position until June 1, 1914, when he was advanced to assistant general freight agent at Kansas City, Mo. His appointment as general freight agent with the same headquarters became effective on January 1.

ENGINEERING AND SIGNALING

W. W. Nuebling, engineer of the Alton & Southern, has been promoted to chief engineer and purchasing agent, with headquarters as before at East St. Louis, Ill.

S. S. Long, engineer and supervisor of bridges and buildings on the Chicago & North Western, with headquarters at Mason City, Iowa, has been promoted to division engineer of the Peninsula division, with headquarters at Escanaba, Mich., to succeed **E. G. Day,** who has been appointed chief engineer of the Lake Superior & Ishpeming.

E. G. Day, division engineer of the Peninsula division of the Chicago & North Western with headquarters at Escanaba, Mich., has been appointed chief engineer of the Lake Superior & Ishpeming, with headquarters at Marquette, Mich., to succeed **R. C. Young,** who at his own request has retired from active service with the title of consulting engineer, effective January 1. Mr. Young had been chief engineer of the L.S.&I. for 33 years.

Banus H. Prater, district engineer of the Central, Northwestern and Southwestern districts of the Union Pacific, with headquarters at Salt Lake City, Utah, has been promoted to chief engineer of the system, with headquarters at Omaha, Neb., to succeed **Howard C. Mann,** who becomes vice-president in charge of operations, as reported elsewhere in these columns. **W. C. Perkins,** division engineer of the Kansas division, with headquarters at Kansas City, Mo., has been advanced to district engineer at Salt Lake City, to succeed Mr. Prater.

John L. Gressitt, acting chief engineer of maintenance of way of the Western region of the Pennsylvania, with headquarters at Chicago, has been appointed chief engineer of maintenance of way of the Western region, effective January 1, to succeed **Porter Allen,** whose death on December 12 was reported in the *Railway Age* of December 19. Mr. Gressitt was born on April 4, 1887, at Baltimore, Md., and was educated at the Baltimore Polytechnic Institute and at Lehigh University, graduating from the latter with a degree in civil engineering. He entered railway service on August 4, 1908, in the engineering corps of the Pittsburgh division of the Pennsylvania, being advanced through the position of chairman, rodman and transitman. On May 1, 1915, he was promoted to assistant supervisor of track on the Bellwood division, later serving in this position at Williamsport, Pa., and at Philadelphia. From October 1, 1917, to July 10, 1919, he was in military service with the 21st Engineers. After the war he returned to the service of the Pennsylvania as acting supervisor on the Monongahela division, later being promoted to supervisor, in which capacity he served during the next seven years on the Monongahela,

John L. Gressitt

Philadelphia Terminal and Pittsburgh divisions. He was promoted to division engineer of the Fort Wayne division on January 16, 1927, and on December 1, 1929, he was further advanced to superintendent of the Sunbury division, with headquarters at Sunbury, Pa. In June, 1931, Mr. Gressitt was transferred to the St. Louis division at Terre Haute, and on November 1 of the same year he was further advanced to general superintendent of the Southwestern division, with headquarters at Indianapolis, Ind. Two years later he was transferred to Chicago. Since January 1, 1936, Mr. Gressitt has served as acting chief engineer of maintenance of way of the Western region.

MECHANICAL

E. M. Caffray, road foreman of engines on the Western Pacific at Oroville, Cal., has been appointed acting master mechanic, with headquarters at the Sacramento (Cal.) shops, to succeed **M. T. Saunders,** master mechanic, who has been granted a leave of absence.

MOTOR TRANSPORT

J. R. Hayden, assistant to the president of the Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Cal., has been appointed vice-president of the Santa Fe Transportation Company, succeeding **J. R. Hitchcock,** general manager of the Coast Lines of the Santa Fe, who will devote his full time to railroad matters. **George Hurst,** assistant general freight agent of the Santa Fe at San Francisco, has been appointed traffic manager of the Santa Fe Transportation Company, with the same headquarters.

OBITUARY

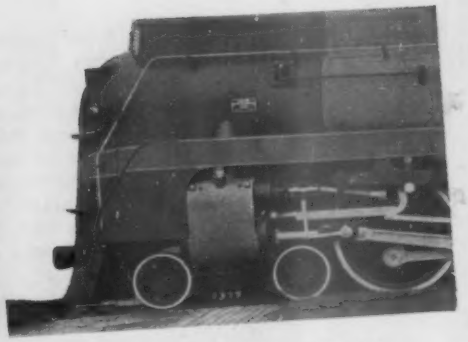
Percy R. Albright, vice-president in charge of operations of the Atlantic Coast Line, with headquarters at Wilmington, N. C., whose death on December 17 was reported in the *Railway Age* of December 26, was born on June 26, 1866, at Greensboro, N. C. Mr. Albright entered railway service in 1888 with the Cape Fear & Yadkin Valley (now Atlantic Coast Line) and from 1890 to 1898 served as chief clerk with that road. From 1898 to 1904 he served as manager of the North Carolina Demurrage Bureau and from 1904 to 1914 as assistant to general manager of the Atlantic Coast Line. Mr. Albright was appointed assistant general manager in 1914 and general manager in 1915. From 1923 to 1928 he was vice-president and general manager and in 1928 he became vice-president in charge of operations. All of the foregoing service since 1904 was with the Atlantic Coast Line at Wilmington.

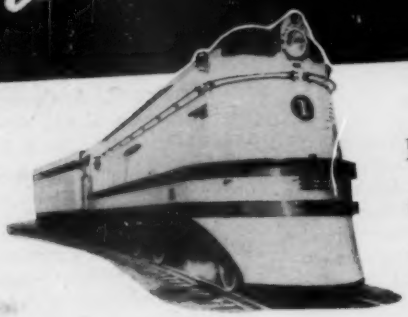
M. B. Morgan, district engineer of the Southern lines of the Illinois Central with headquarters at New Orleans, La., died at the Illinois Central hospital in Chicago on December 26 following a lengthy illness.

Charles C. Anthony, formerly of the Pennsylvania signal department and former president of the Railway Signal Association, died at his home at Mill Valley, Cal., on November 15.

Charles Hansel, consulting engineer, who for many years was directly connected with railway engineering and valuation work, died on December 24 at his winter home in Punta Gorda, Fla., at the age of 77 years. Mr. Hansel, who was born on July 31, 1859, at Peoria, Ill., was for four years locating and construction engineer for the Denver & Rio Grande (now Denver & Rio Grande Western) and was engineer in charge of the building of the first line of that road into New Mexico. From 1884 to 1889 he served as chief engineer of the Wabash, and subsequently became consulting engineer for the Railroad and Warehouse Commission of Illinois. From 1904 to 1906 he acted as consulting engineer for the Indiana Harbor Railway (now Indiana Harbor Belt), and on May 4, 1909, he was appointed a commissioner by the Governor of New Jersey to appraise the railroad and canal property in that state. In 1912, Mr. Hansel made a valuation of the Duluth, South Shore & Atlantic for the state of Michigan, and in 1913, he made a similar valuation of the Reading in connection with the Anthracite rate case. In that same year he became a member of the Engineering committee of the Presidents' Conference Committee on Valuation of Railroads, and in subsequent years he served as chairman of the Valuation committee of the Reading, the Central of New Jersey, the Philadelphia Rapid Transit Company and the International Railway Company, and at one time acted as consulting valuation engineer for the Pennsylvania. Until recently, Mr. Hansel had taken an active part in the firm of Charles Hansel Construction Specialists, which firm specialized in problems of law, engineering and economics arising under the Interstate Commerce Act and the Federal income tax laws. Mr. Hansel was a member of the American Society of Civil Engineers and the Engineer's Club of Philadelphia.

Keeping pace with new Standards of MODERN





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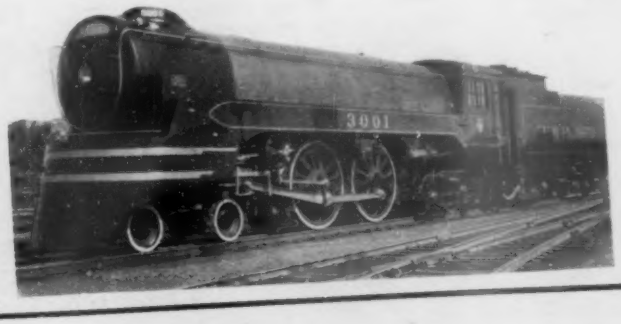

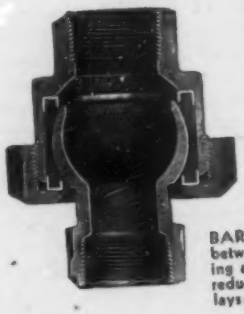

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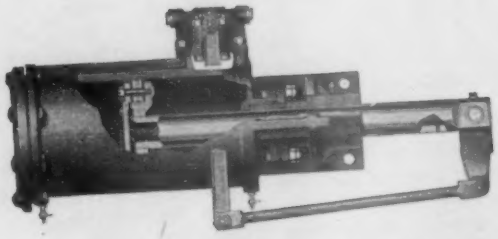

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